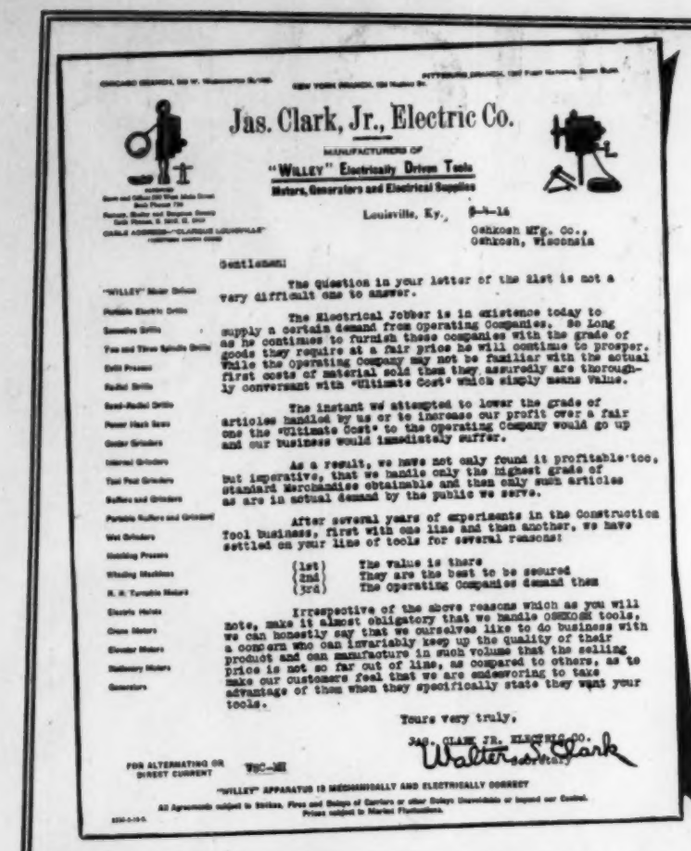
TELEPHONY

Volume XVI



Jas. Clark, Jr., Electric Co.

MANUFACTURERS OF

"WILLEY" Electrically Driven Tools

Motors, Generators and Electrical Supplies

Louisville, Ky., 8-4-16

Oshkosh Mfg. Co.,
Oshkosh, Wisconsin

Gentlemen:

The question in your letter of the 31st is not a very difficult one to answer.

The Electrical Jobber is in existence today to supply a certain demand from Operating Companies. So long as he continues to furnish these companies with the grade of goods they require at a fair price he will continue to prosper. While the Operating Company may not be familiar with the actual first costs of material sold them they assuredly are thoroughly conversant with "Ultimate Cost" which simply means Value.

The instant we attempted to lower the grade of articles handled by us or to increase our profit over a fair one the "Ultimate Cost" to the Operating Company would go up and our business would immediately suffer.

As a result, we have not only found it profitable too, but imperative, that we handle only the highest grade of standard Merchandise obtainable and then only such articles as are in actual demand by the public we serve.

After several years of experiments in the Construction Tool business, first with one line and then another, we have settled on your line of tools for several reasons:

(1st) The value is there
(2nd) They are the best to be secured
(3rd) The operating Companies demand them

Irrespective of the above reasons which as you will note, make it almost obligatory that we handle OSHKOSH tools, we can honestly say that we ourselves like to do business with a concern who can invariably keep up the quality of their product and can manufacture in such volume that the selling price is not so far out of line, as compared to others, as to make our customers feel that we are endeavoring to take advantage of them when they specifically state they want your tools.

Yours very truly,

JAS. CLARK, JR. ELECTRIC CO.

Walter S. Clark
Secretary

FOR ALTERNATING OR DIRECT CURRENT WC-16

"WILLEY" APPARATUS IS MECHANICALLY AND ELECTRICALLY CORRECT

All Agreements subject to Strikes, Fires and Delays of Carriers or other Delays Unavoidable or beyond our Control. Prices subject to Market Fluctuations.

(1st) *The Value is there*

(2nd) *They are the best to be secured*

(3rd) *The operating companies demand them*

For these three very good reasons, OSHKOSH Tools were chosen in preference to all other lines.

Mr. Clark is one speaking for many—he simply means that his trade has found by experience that the OSHKOSH line is the very best.

You're going to need tools soon—so write for a copy of the OSHKOSH catalog—we will give your nearest dealer's name along with your copy.

TRADE OSHKOSH MARK

MANUFACTURING CO.

OSHKOSH - WISCONSIN

This Telephone Testing Set Only Weighs 7½ Pounds

It Is Complete,—has the necessary buzzer, transmitter, watch case receiver, and a powerful little 3 bar generator especially designed to ring ten 1600 ohm bells through a resistance of 4000 ohms when the receiver is out of the holder.

The battery is a 3-cell Tungsten.

We are prepared to furnish either an 80 or 1000 ohm buzzer.

The standard finish is quarter sawed oak, with nickel plated trimmings.

Write for Bulletin 204

The Holtzer-Cabot Electric Co.,

Chicago, Ill. and Boston, Mass.

STANDARD
Colonial Copper Clad Wire

TRADE **C.C.C.** MARK

has satisfactorily met the requirements of large and discriminating buyers for many years. Its economy in installation and maintenance has therefore been proven by years of exacting service tests. There may be many places in your telephone system where C. C. C. Wire can be economically employed.

For further information write our nearest office for new C. C. C. Bulletin No 202.

Standard Underground Cable Co.
Pittsburgh, Pa.

Boston, New York, Philadelphia, San Francisco, Chicago, St. Louis

AWARDED PANAMA PACIFIC "GRAND" PRIZE

W & M Telegraph and Telephone Wire.

Strand and Pole Steps.

Made by

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

Editors: ED. J. MOCK, PAUL H. WOODRUFF
New York Representative: CHARLES R. CONDON
New York Office, 1022 Longacre Building
Forty-second St. and Broadway
Telephone Bryant 7030

This publication is free and independent of all business or house connections or control. No manufacturer or supply dealer, or their stockholders or representatives, have any financial interest in Telephone Engineer or any voice in its management or policy.

Entered at Chicago Post Office as Second Class Mail Matter

Telephone Engineer

WITH WHICH IS CONSOLIDATED
The Western Telephone Journal
ESTABLISHED 1902

PUBLISHED MONTHLY BY
ELECTRICITY MAGAZINE CORPORATION
MONADNOCK BUILDING, CHICAGO, ILL.
Telephone: Harrison 3014—All Departments

NOTICE TO ADVERTISERS

Changes of advertising copy should reach the office of publication not less than ten days in advance of date of issue. Regular date of issue, first day of each month. New advertisements will be accepted up to within five days of date of issue, but proof of such advertisements cannot be shown in advance of publication.

SUBSCRIPTION PRICE
Per Year $2.00
Canada $2.50
Foreign 3.00
Single copy 20
FOR SALE AT ALL NEWS STANDS

NOTICE TO SUBSCRIBERS

REMITTANCES—Remittances should be made by check, New York draft or money order, in favor of TELEPHONE ENGINEER. Foreign subscriptions may be remitted direct by International Postal Money Order.

CHANGE OF ADDRESS—The old address should be given as well as the new, and notice should be received two weeks in advance of the desired change.

If Your News Dealer Will Not Supply You—Please Notify Us

VOL. XVI CHICAGO, SEPTEMBER, 1916 NO. 3

Independent Telephony's Handicap of Obscurity

IN a particularly illuminating article by a man whose observations are always valuable, Terry W. Allen calls attention this month to a really serious situation. Of a number of state utility commissioners whose views on the subject have been revealed, he finds a majority in favor of a single telephone system—and therefore antagonistic to the principle of Independent telephony.

Mr. Allen's examinations extend only to a few of the genus commissioner; but we have a decided theory, amounting to what is termed a hunch in modern English, that the proportion he observed as being partial to monopoly would carry through the line.

The author of "What National Advertising Would Do" is convinced that these same commissioners, who subscribe so readily to the nuisance theory of two telephone systems, would never dream of advocating the same principle in railroad practice. They not only recognize the propriety of two or more railroads serving the same territory, but admit the efficiency of the physical connection system by which competing railroads handle each others' business. Yet the possibility that a similar system of interchange is practicable between competing telephone companies they will not even entertain as a suggestion.

The question of physical connection of telephone lines has been so thoroughly and exhaustively discussed in these pages for years that there is no necessity for a reopening of the argument at this time. TELEPHONE ENGINEER advocated physical connection of all lines as a positive cure for the monopoly doctrine a long time ago; at a period, indeed, when the subject was regarded as a delicate one, and Independent operators knew so little of it that they thought it was Bell propaganda. We have consistently followed the same line of logic ever since, in spite of the now demonstrated fact that it is contrary to Bell "policy," and the object of bitter Bell opposition.

The question of telephone monopoly also has had its share of exposition, and it has been shown that even the advertising of the big Bell system has recognized the danger and unwisdom of monopolistic claims, and has made positive effort to steer the public eye away from its monopolistic escutcheon. It has bought expensive space solely to carry the message that it is not a monopoly, and that it has no aspirations in that direction.

We can confine our present study, therefore, to the fact that a certain number—possibly a majority—of the members of state utility commissions believe in monopoly in the telephone business. This belief in itself is not so important as its secondary result: That, so believing, they have little patience or respect for Independent telephony.

Having arrived at that conclusion, which finds demonstration particularly in the standard commission treatment of merger cases (for we cannot complain of the manner in which the more technical cases are handled), we find it natural to fall into an abusive frame of mind. It becomes easy to condemn all commissioners, politicians, public job holders, etc., as men of easy control and low brain power, and to set down their expressed opinions as due to subsidized prejudice. In plain language, the inclination is to believe the commissions controlled by the Bell interests.

But before jumping to that conclusion and so placing under suspicion a number of worthy

men whose integrity has never been questioned before, a little introspection will prove wholesome mental exercise.

If men in public office are prone to regard Independent telephony as insignificant, as a sort of scattering parasitic growth fostered by evidences of Bell success, can we concede them any reason for that attitude?

The Bell system is a national institution.

The Independent system—if system we may call it—is a local institution or series of institutions.

Those facts have redounded to the credit and advantage of Independent telephony, back in the days when capital from the money centers was fought with capital from the local farms and stores and socks and teapots.

But in those days there was no public regulation. The number of competing franchises that might be granted in any community depended upon the humor of the city councils. And the habit of advertising in national magazines had not yet reached the public utilities.

Today it is a safe assertion that everybody knows the Bell telephone system. Whether they know it favorably or unfavorably, by contact or by repute, they know it.

But the Independent movement, as an institution, is not known to a majority of the public. People who live in St. Paul, of course, know all about the Tri-State; but they do not know any more about the Johnstown Telephone Company than they know about the city filter at Binghamton or the hydro-electric plant at Berrien Springs. More than one Independent operator has had some unusually inquisitive subscriber ask him, "Is there any other Independent system besides yours?"

Can you imagine anyone but an idiot asking a Bell operator such a question? Yet it is a perfectly legitimate and sensible question, directed at an Independent operator, because there is no medium in the world by which the public can learn of the existence of more than one Independent at a time.

And there is no medium in the world by which the public can learn of the existence of the United States Independent Telephone Association—the only possible claim Independent telephony has to being a national institution. The only link that makes Independent telephony an entity—and nobody ever heard of it outside of the industry!

Some months ago we tried hard to arouse interest in a method of gaining public recognition for the Independent cause, under the heading "Fifty Dollars a Week Will Do It." We still maintain that a clever and trained publicity writer, whose wage need not exceed that figure, could get the word Independent into the newspapers in a way that would be worth many times his cost. We were informed that the question of employing such a man had been placed in the hands of a committee, and word of its disposal has not reached us.

We must concede to Mr. Allen, of course, his point that a vigorous campaign of paid advertising, country-wide in its scope, could be the only royal road to quick recognition. We trust our Independent friends will not take amiss our declaration that we do not believe they could afford such a campaign. A single page in the Saturday Evening Post—dead in a week or less—costs five thousand dollars, and that amount spent in quarter pages (the smallest effective space) would last but a month. And we mention that particular periodical only because it so conveniently demonstrates the cost of national advertising.

Perhaps we underestimate the readiness of the Independent purse (we have no doubts about its ability). Perhaps it would be possible to persuade the Independent operators to raise an advertising fund of sixty thousand dollars a year as a minimum. If so, no one could be more pleased than we to see that amount put into the tedious task of educating the public.

The United States Independent Telephone Association—and under that comprehensive title we include all its predecessors—has done a great and wonderful work. It has been a devoted and unselfish work, calculated to help the individual member and solve his problems and make telephony easier for him. But it has been, for that very reason, a narrow and circumscribed work. It has taken account only of telephone men—of its friends and their enemies within the iron circle of the trade. With the public it has left its members to deal on their initiative. It has divided the public into two classes—subscribers and non-subscribers; and with neither has it interfered.

For an Independent subscriber is merely a subscriber to a single Independent company.

And there his interest and information ends. Never has any attempt been made to excite the one or supply the other.

Independent telephony has yet to learn what the Bell people learned long ago: That subscribing to its service is not the most vital relation of the public to a telephone company; and that the general public, that passes laws and appoints representatives to enforce them, is more important than the local public, that merely buys service.

So what we must regard as one of the greatest natural functions of an Independent telephone association is still unperformed. We cannot but consider that it is the duty and obligation of such an association to its industry to gain fame and public understanding for that industry.

That the United States Independent Telephone Association has not supplied this need is no discredit to any of its officers, who have done all that its members instructed them to do, and more. Its failure to undertake that work is due to the inability of any consequential number of Independent operators to realize the necessity for such action. Like most American citizens it takes a calamity to awaken them to the fact that their lives are not wholly sheltered and protected by a kind providence.

Support of monopoly by the regulating commissions would constitute such a calamity. Apparently it already threatens. Mobilization of what slender forces Independent telephony has at its command cannot be undertaken any sooner than now, and perhaps it is not yet too late. Surely there is enough fighting blood left in the Independent ranks to respond to the call.

If Independent telephony persists in its present course, and continues to ignore and avoid the invitation to participate in those national and popular activities that bring public recognition, the most sanguine consideration cannot anticipate anything but the gradual waning and final extinction of the word Independent as applied to national telephone affairs.

The Chicago Fight Continues

APPARENTLY the Chicago Independent system is not to become thoroughly Bell until every method of resistance has been exhausted. All the testimony in the case, now so familiar to Independent telephone men, is being repeated before the acting attorney general in Washington with undiminished vigor.

We have never had much patience with the Chicago situation, and have been inclined to regard the sale of the Chicago property as an Independent gain rather than a loss. Companies with so sinister a history reflect little credit on any cause.

In few of the many merger cases involving Bell and Independent companies have the records demonstrated so obviously the extraordinary value placed by the Bell interests upon the removal of competition.

The Chicago case has been remarkable in many ways. No one outside of the circle of negotiations professes to understand any part of the deal—and those who are directly interested apparently will not tell if they can help it.

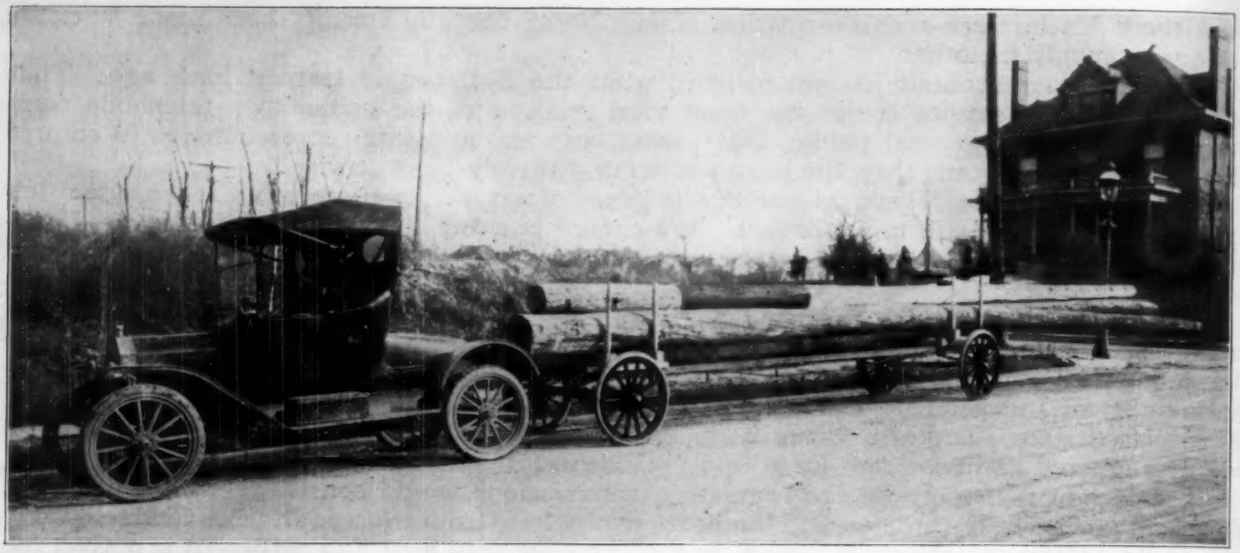
The apparent anxiety to be rid of a competitor whose competitive vitality was long since exhausted; the eagerness to pay a sum of money millions of dollars in excess of the appraised value of the property; the actual refusal of the purchaser to consider a lower price than he offered; all these things, to the average man, are deep mysteries, whose solution may never appear.

We believe the average Independent, operating on a sane and daylight basis, has long ago washed his hands of the Chicago affair. Even the prospect of Independent connections with Chicago, for which the operating companies are justly contending because such connection is a recorded promise, seems not a little dubious if the Chicago company did continue to operate.

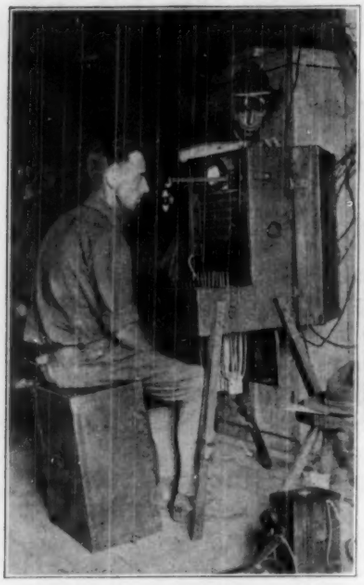
A government refusal to allow the merger would prevent the Bell company from spending a big sum of money in what seems to the outsider a profitless investment; and there is little reason why the Independents should strive to keep the Bell from spending money foolishly.

Nevertheless, the moral effect of annulling the merger would be considerable and would doubtless furnish material for successful resistance to other mergers.

Therefore we hope the attorney general's office may decide against the transfer.

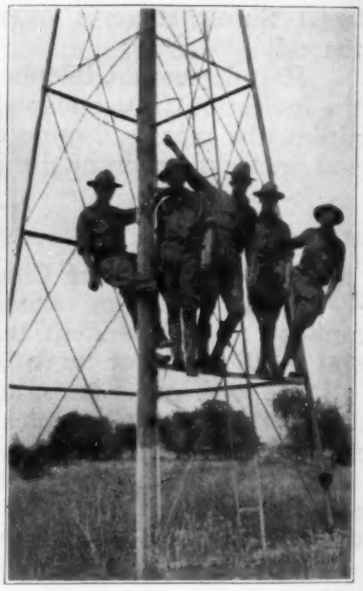


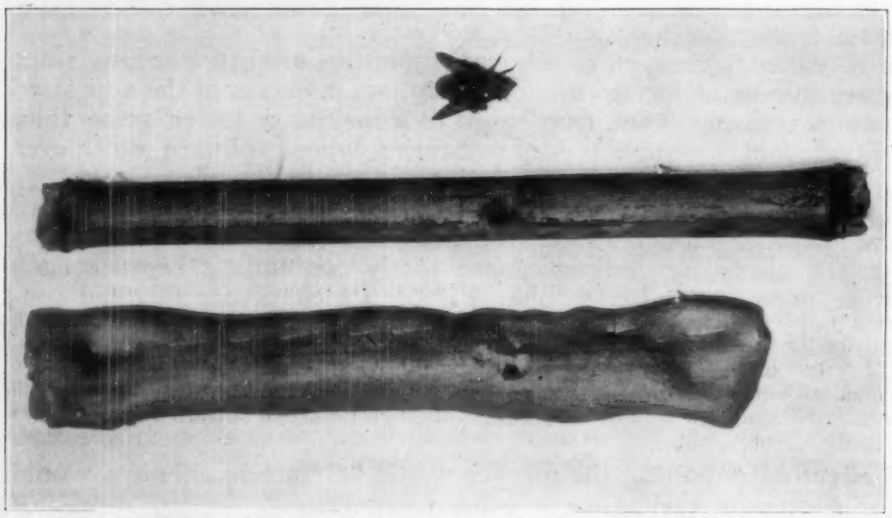
A novel trailer for telephone poles developed at Cincinnati, Ohio, of one ton capacity, for rapid transportation of poles. The wheelbase is 17 feet 2 inches. Solid 2½ tires are used.



Capt. W. Y. Hendron, First Infantry I. N. G., at Leon Springs Military Reservation, Texas, just completed a 15-mile line with a 10-terminal board, shown at the left, in five days. The men, Mundt, De Bruyn, Talcott, Hanson and Byerly, are the right.

In the center, long distance headquarters at Camp Douglas, Wisconsin.





Chief Engineer Philip H. Cole, of the Shanghai Mutual Telephone Company, Ltd., brought Telephone Engineer *this example of the problem he is up against. The wood-cutter bee is in the habit of drilling holes into bamboo and laying her eggs there. With the advent of the lead-sheath cable, Mrs. Bee thought she had a new kind of bamboo and proceeded to chisel the hole shown. Then Mrs. Bee commenced to lose interest in her new bamboo find as soon as the copper and paper come to light, and flies away to a real bamboo. In the meantime the rain completes the job for the troubleman to worry about.*

STORIES IN PICTURES OF TELEPHONE PRACTICE AND PROGRESS IN ALL PARTS OF THE WORLD.

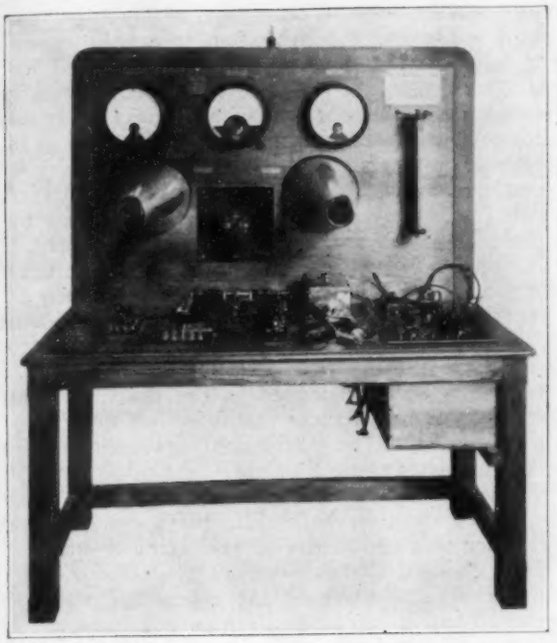


Fig. 1. Electrical Equipment of the Colin-Jeance System.

Fig. 2. Use of the Reineke Wireless Telephone.

Underground Wireless Telephone in Europe

Novel and Ingenious System Used in the Mines

BY FRANK C. PERKINS

A WIRELESS telephone system developed at Paris, France, by the Compagnie Generale de Radiotelegraphie, has a radius of action of about 200 kilometers. The accompanying illustration, Fig. 1, shows the switchboard and electrical apparatus utilized.

This French system, the "radiotelephonique Colin-Jeance," is supplied with current from a dynamo of 500 to 750 volts, from 3 to 4.5 amperes being used. The tension of the arcs in the oscillating circuit varies from 250 to 350 volts, a variable condenser being placed in parallel with the arcs. The current intensity used in the antenna is 3.5 amperes while the microphone current intensity is .5 ampere, the wave length being 985 meters in the Colin-Jeance system.

In the illustration Fig. 2 may be seen apparatus of the Reineke wireless telephones for mines, utilized in Germany and in England, the photograph showing the fixed wireless telephone with the operator speaking from the surface to underground positions, while a portable instrument is used for speaking from the mine cage to the engine house.

Engineer T. M. Winstanley Wallis pointed out to the Institution of Mining Engineers that in Germany, as in England, the government had for some time past urged the installation of telephones in mines; and as the usual troubles in the way of damage to wires occur equally in Germany and elsewhere, Herr Reineke, the inventor of this system, experimented with the view of overcoming these difficulties.

This system is in regular use in the Carolineneglück Pit, Bochum, Westphalia, where no other method of signalling is used and the Wireless Telephone Company, Ltd., of London, has been introducing the system in English mines. It is pointed out that in using the term "wireless" it is advisable to explain that the system is entirely distinct from that commonly used in wireless (or spark) telegraphy, as there are serious objections that would prevent its general use in mining work.

The ordinary telephone may be broadly described as working by the actual transmission of current along wires. The strength of the current is varied by the sound-waves of the voice, which cause a diaphragm in the transmitter to vibrate to a greater or less extent, and so to vary the resistance offered to the current by a mass of carbon particles. This varying current is conveyed along the wires to the receiver, the diaphragm of which is caused to vibrate by a magnet excited by the current, and thus the sounds of speech are reproduced by that diaphragm.

It is stated that in the wireless telephone, the transmission and reception of the speech occur in a precisely similar manner, but there the resemblance ends. Instead of the current from the transmitter being conducted along the wire to the receiver, it is converted to high pressure by means of a transformer contained in the telephone case. As the high-pressure or secondary winding of the transformer is connected to the ordinary rails or pipes in the pit, it communicates to them a charge of electricity, which spreads over the whole system of rails throughout the pit, and varies with the fluctuations of the primary current in the transmitter circuit of the telephone. It is unnecessary to make any special provision to insulate the rails or pipes, or to connect the adjacent lengths electrically.

It is said that the invention resulted from the discovery that the conditions of distribution of electric

charges underground are entirely distinct from the conditions that hold true on the surface of the earth, and the working of the system largely depends on this fact. Speech can be received by connecting telephones to the rails or pipes at any point of the system, either by bridging a sufficient length so as to obtain a suitable difference of pressure; or by connecting between the rails and pipes, if these exist; or, as is sometimes convenient in the case of portable instruments, by connecting to an antenna consisting of a loose coil of wire, which may be laid on the floor or hung on the timbers.

It may be stated that as in the ordinary telephone, a bell is used for calling attention, the bell being operated by a specially designed relay. On the button being pressed at the transmitting stations, all the telephone bells will ring, and all the telephones can receive the message by taking the receiver off the hook, which operation cuts off the bell and connects the receiver in the usual manner. It is possible to tune the relays so that each will respond only to its own particular signal, and thus any one station can be called; but in mining work this is usually not necessary or desirable, and the different stations are called by giving one, two or three rings, as pre-arranged, while it is always possible, by a special signal, to call all the stations and speak to all simultaneously.

In the Reineke wireless telephone system for mines the current required is furnished by an ordinary battery; in fact, in outward appearance the telephones are exactly similar to an ordinary mining telephone. The portable instrument, which can be carried about and used in any part of the pit to which the rails extend, is contained in a strong metal case, the total weight being about 20 pounds. This telephone can either "ring up" the other stations or be "rung up" by them. A smaller or pocket instrument is also made, which can ring up other stations, but cannot be called by them.

It is pointed out that with the Reineke wireless telephone instrument for mines messages can be sent to or received from any of the fixed telephones, the only difference between it and the heavier portable type being that the other telephones cannot call it by ringing its bell. Thus each official provided with an instrument can give notice of any accident and ask for assistance from any point in the pit. A telephone can be fixed at any convenient position on the surface, and connected to the headgear, if of iron, or to the winding rope or pipes which go down the shaft.

It is maintained that this telephone can speak to any of the telephones underground if necessary, but it is usually found more convenient to arrange for it to speak to the station at the pit-bottom only, and for this sation in turn to speak to the underground telephones. In metalliferous mines, where a number of different levels run from the shaft, communication can be established from one level to another as required, the presence of the ore-bodies not affecting the speaking in any way.

A most important application of the system is that of speaking from the moving cage to the winding-engine-house and for the latter position the inventor has designed an ingenious method of operation. The telephone is mounted on a standard fixed close to the engineman's ear. On receiving a call, he has only to put his ear to the receiver, and the slight pressure is sufficient to switch in the telephone and enable him to communicate with the cage, without removing his hands from the levers.

It is stated that there are various methods of connection possible for the telephone in the cage, one of the most satisfactory being when it can be connected into a loop formed by the winding-ropes and by the balance rope (or, if this is not used, by a wire suspended below the cage in the same way). It is then possible to speak from either cage to the surface or to the pit-bottom, without any alteration in the ordinary winding arrangements. The surface telephone is preferably connected in circuit with a loop of wire fixed to the headgear, or in the shaft in any convenient place.

A number of methods of telephoning from the cage to the shaft have been previously proposed, such as the construction of a winding-rope containing an insulated wire, or of insulating the attachment of the rope to the cage and also the overhead sheave, or by using sliding contacts to a wire suspended in the shaft. There are definite defects in all these methods, but they need not be discussed, as the best argument against them is that none of them has come into use.

The advantages of this wireless mining telephone are many, and it is absolutely safe, there being no possibility under any conditions of producing a spark.

It is claimed that it provides complete security of communication, as there are no connecting wires to be interrupted and it can be easily removed from one place to another if required, while it cannot be affected by or affect other electrical circuits in its neighborhood, whether these are direct or alternating currents conveying power, or used for signaling—nor is it interfered with by ordinary wireless telegraphic signals.

The opinion of the Continental experts who have exhaustively tested the telephone has been universally favorable, and indicate that in this system a means of underground communication has been provided which is entirely free from any of the objections that have hitherto prevented the general use of telephones in mines.

West Tennessee Independent Association Formed

On August 15 various Independent telephone exchanges representing the telephone interests of West Tennessee met at Union City, Tenn., and formed an association known as the West Tennessee Independent Telephone Association. This association is affiliated with the Southern States Independent Telephone Association and will work with that association in West Tennessee.

The following officers were unanimously elected at the meeting:

J. H. Todd, Union City, Tenn., president.
J. W. Moore, Trenton, Tenn., vice-president.
W. R. Gilbert, McKenzie, Tenn., secretary.

A constitution and by-laws was adopted, and the association hopes to work up interest for Independent telephony in West Tennessee. A board of directors is to be appointed later to have charge of this matter.

Indianapolis Still Buying

The Indianapolis Telephone Company is negotiating the purchase of the Danville Consolidated Telephone Company's property at Danville, Ind. An option which expires September 1 is said to be held by the Indianapolis company on the controlling stockholders' interest at a figure amounting to considerably over $100,000. Officers of the local company refused to confirm or deny the report that the option has been given.

What National Advertising Would Do

Public Utility Regulating Bodies Need Educating

BY TERRY W. ALLEN

DURING the past month, I have been before two railroad commissions in the state of Mississippi and in the state of Tennessee. The cases were entirely different and it is not about the cases that I desire to write. The situation is, though, that when I was before the Mississippi Commission two of the commissioners openly and without any hesitation condemned Independent telephony and spoke in favor of one telephone system.

In Tennessee before the Railroad Commission, one of them was sick and there were only two present; but one of the commissioners in Tennessee stated that one telephone system was preferable to two telephone systems. In other words, out of five commissioners three expressed themselves as being opposed to Independent telephone companies, not any specific Independent telephone company nor any specific condition where Independent telephony thrived, but just as a general proposition.

Since being before those commissions, I have thought deeply upon the reason for this condition. Certainly none of these commissioners would have stated in an open meeting that he was opposed to two railroads in a certain community. Certainly none of these commissioners would have stated that he was opposed to two telegraph companies in a community. But they did state, and openly stated, that two telephone companies were a nuisance and a hardship upon the public and something that they wished they could remedy so there would be just one company or system.

It is true that they did not say that this one company should be the Bell, but just one telephone company.

In trying to analyze a proposition of this kind, you must take into consideration that the capitols in which these railroad commissions are installed have no competition, and consequently they do not know whether competition is good or bad from the state capitol's standpoint.

While I was in the capitol at Nashville, Tenn., the secretary of the Railroad Commission was complaining of the poor telephone service rendered at that point, claiming that the commission's office was called fully twenty-five or thirty times without anyone being at the other end of the line, giving the commission a lot of trouble in this respect. Yet the commissioners are advocating one telephone system; no matter how bad it may be under their own observation, still it is considered proper in their estimation.

It is a strange idea to my mind that men elected and serving in public positions would come out and openly condemn a part of the service under whose direct control that service is. When they brought up this question of competition and that one telephone company should be all that we should have, I asked them if they would be willing to give us some form of physical connection which would eliminate all the troubles that seemed to their minds to pervade two telephone systems. But they were not willing to answer this question, because the truth about the matter was that they did not know anyhing about physical connection except in connection with railroads, and they never thought of applying that to telephone companies.

To my mind it looks like a serious condition. If that is true in two states, Mississippi and Tennessee, is it not true in a majority of the other states of the Union? Is it any wonder that Independent telephony is suffering from commission regulation when the commissioners' minds are biased to start with? Is it any wonder that mergers can be consummated in the different states with the commission's consent? But I attribute this condition to just one fact, and it is the most serious indictment that can be placed against Independent telephony. It is the fact that Independent telephony is not advertised, that nine-tenths of the advertising in this country is the advertising of "one policy, one system, universal service." It goes into backwoods newspapers; it goes into city journals and magazines and every kind of publication, and is carried here and there throughout the country, forming an advertised opinion of a condition.

The Independent interests might just as well realize that they have got to advertise to stay in business. I have called attention to this fact before and I reiterate it now. When the Automatic Electric Company advertises in the different magazines of the country, there is no suggestion that it is building *Independent* apparatus, and other advertisers who advertise largely in the magazines never state that they are makers of *Independent* telephone apparatus. Consequently, the public's mind, the public service commissioner's mind and every one else's mind is permeated with the idea of universal service advertising of the Bell Telephone Company. Business men generally condemn two telephone companies without thinking. If a new railroad is projected and started toward a certain town, the railroad promoters will go before and herald the event, and not only the city but the county also through which this railroad will go votes large sums of money to bring the railroad into the town; but let an Independent telephone company project its lines toward a given place and it has the utmost difficulty in even securing an equitable and just franchise to carry on its business. In lots of cases the commercial organizations of the town that is being approached will set up a howl and try to exclude the Independent company through the so-called Business Men's Associations. They do not stop to analyze the telephone situation. They do not stop to consider that an Independent telephone company will bring to their business a double number of subscribers and a double number of people to trade with, and also service at reasonable rates, whereas under monopoly and monopolistic rule, they have been paying exorbitant prices for the most inferior kind of telephone service.

The railroad will get hundreds of thousands of dollars to build a line while every sort of legislative and municipal hindrance will be thrown in the way of an Independent telephone company.

I want to repeat my own idea after analyzing this matter; I have come to the conclusion that the advertising by the Bell Telephone Company for numbers of years and the lack of advertising on the part of Independent telephone companies during the same period has brought about this condition. The associations representing Independent telephony have really done very

little toward building up the broader general public sentiment in favor of competition in the telephone field, and it is for that reason that the present conditions obtain in the Independent telephone field, and that is why the very lives of the Independent companies remaining are being jeopardized.

It has often been said, and truly said, that the best way to fight fire is with fire, and it can be just as truly said that the only way to offset national advertising is by national advertising. During the present year a large sum will be raised to carry on the United States Independent Telephone Association's work. It will be the largest sum that any national association has ever had provided for this use, and yet if five national advertising contracts had been let to certain syndicates of magazines in this country it would have accomplished more than all of the work of all the associations, both state and national, put together.

The only way to make a demand for your products is to create that demand. If people understood what Independent telephony was and what it was striving for and what its object was, namely, to give better service at a cheaper rate and to be accorded the rights and privileges of common carriers to which it is justly entitled, the country would sympathize with us rather than condemn us. The large cities would understand our aims and motives rather than be led by the old slogan that two telephone companies are a nuisance.

If we only had nation-wide publicity; if the "Independent Telephone Shield" was as well known as the "Blue Bell"; if we had equitable toll contracts, which we are justly, under the laws of the country, entitled to we would not have to make excuses for the use of the Independent Shield. We would not have people saying, "Oh, that is only an Independent telephone company, they do not reach anywhere." We would have the nation as a whole understanding our problem, and if they understood it, they would be working for us in every section of the country.

But you cannot hide your light under a bushel and expect it to be seen from the surrounding country, and if the Independent telephone operators and manufacturers do not realize this fact and do not start a nation-wide campaign of advertising, it is going to mean that sooner or later the strangle-hold that has been given the American Telephone & Telegraph Company and its subsidiary companies will be triumphant, unless Federal intervention can be brought to our assistance. It is a down-right shame that Independent telephony must call on the Federal Government to do for it what it can so easily do for itself; yet we have remained impotent in the face of the greatest fight ever put up by a monopoly for recognition.

It is not too late to mend our ways and a good and substantial future is before us, but if we continue to neglect the opportunities that we have a our very door, we are going to reap the reward that such a condition will naturally bring about.

I do not mean to belittle the advertising campaigns that are sometimes carried on locally by different Independent companies; but I mean that generally throughout the United States there is only a vague idea of Independent telephony. And that idea is going to remain vague unless we do something to offset it.

Human beings are alike everywhere and they are easily influenced by advertising. That is distinctly shown by the volume of advertising that is carried by the public press and by the magazines of this country. We have needed it for years and we need it now more than ever for we are fighting for our lives. Something along this line should be attempted in the near future.

Oklahoma to Get New York and Frisco

Transcontinental telephone service to New York and San Francisco from Oklahoma City will be a reality when the plans of state telephone men materialize. The development of this service was discussed by the traffic men of the Pioneer Telephone Company, at a banquet in the Lee-Huckins hotel. The speakers emphasized the fact that the time is not far off when telephone calls from Oklahoma City to all parts of the United States will be common.

One of the traffic men told of a call from Oklahoma City to New York which cost the talker $75. "We encountered a storm in one of the eastern states," said the speaker, "and had to switch the call to another line, but outside of that, the conversation was uninterrupted. The man who talked to New York had important business which demanded rapid-fire action and he did not object to the toll."

Other plans to keep the telephone service up to the demand of the public were discussed. The banquet marked the end of a three-day conference of telephone men. Among those who attended the meeting were: J. R. Thompson, general traffic superintendent of the Pioneer; C. B. Crabbe, division traffic superintendent of the Pioneer; T. L. Golay, Tulsa; O. D. Sackman, Shawnee; H. L. Baldwin, Muskogee; A. R. Harris, Lawton; A. H. Empson, Enid; O. H. Kirkland, Oklahoma City traffic chief; F. C. Hirdler, Oklahoma City, supervisor of traffic; J. P. Wadham, American Telegraph & Telephone Company, Kansas City; R. E. Hart, Dallas; George Gilker, Fort Worth, and John Palmer, Amarillo.

Inclusions in the Silver Voltameter Deposits

The results of a careful series of measurements to determine the amount of impurity contained in deposits of silver made in the "silver voltameter" have just been published by the Bureau of Standards, Department of Commerce, in its Scientific Paper No. 271.

The silver voltameter is the international standard for the precise measurement of electric current. The importance of measuring the inclusions arises partly from its use as a primary standard and partly because it is important from an electrochemical standpoint to determine what difference there is between the value for the electrochemical equivalent of silver as defined for the purposes of electrical measurement and the absolute value. The present work indicates that under the best conditions the impurities in the silver deposits are about four-thousandths of one per cent. The results of this work permit a correction to the value of the "Faraday" which is an important constant in physical chemistry and certain branches of theoretical physics.

Copies of the publication, entitled "Inclusions in the Silver Voltameter Deposits," will be sent free to persons interested upon request to the Bureau of Standards, Washington, D. C.

The continually improving earnings statements being made by the Chicago Telephone Company and other large telephone operating corporations are a great source of wonder when viewed in the light of the enormously increasing cost of raw materials.

European Telephone Development

Translations from the Foreign Press and Communications from European Engineers

BY FRED W. SCHOLZ

WITH the ever increasing development of telephone systems, the construction of telephone lines tends more and more towards the use of cables, although the longer cables for very long distances do not as yet give the same good results that open wires give. It is essential to review the development of telephone line construction somewhat at a time when this phase of telephone work, owing to the means of strengthening telephone currents, is evidently entering on a new phase of development.

The evolution of the receiver and of the microphone have reached a limit in a way and the clearness of speech and the distance to be covered depend now only on the nature of the telephone lines used. Of the lines laid up to the present time, the older open and bare wire line has the advantage of spanning the greater distance and up to a certain degree, at lower cost. At present the cables have the advantage mainly in furnishing greater safety in operation. For lines above 600 miles only wires are used and cable lines of a few hundred miles length are used only since comparatively few years in any large numbers.

If, then, in regard to distance the use of cables has even shown a retrograde movement in development, it is clearly shown that another factor is of greater influence, namely, the increase of telephone systems by increased subscribers and not by increased distances. In this regard the open wires have not met the demands satisfactorily; they have disappeared in smaller and larger cities, where the subscribers are fairly dense, and in long distance lines the open wires will disappear in proportion as it becomes possible to increase the distance covered by cables. In the application of cable lines for long distances, it will have to be remembered that besides distance the density of population and consequently of subscribers is of great influence and that development will have to figure with these two factors instead of with the distance factor alone.

Long Distance Lines and Subscribers Lines: The greater number of telephone lines is used as part of the great telephone systems of cities and entire districts. Only in isolated cases will it be a question of telephone lines that are used principally for conversation between two or more places, as might be the case in lines running between two large long distance exchanges or else in private wires that run between two places at quite a distance from each other. In such cases where the line is used purely for communication between two points at some distance from each other, the distance alone is the principal factor. In the large telephone exchanges, which are used for general telephone traffic, every connection is made up of a number of telephone lines. The communication and clearness of conversation must therefore be so arranged that conversation is possible with any combination of connections that might be asked for. The direct communication for distant places must therefore be often better than would be required of private lines that communicate with each other only. For local telephone traffic the problems coming out of the large number of lines required have led to a standard type of construction, whose influence on communication in local traffic is only very small. But for long distance lines it is necessary that the constructions of lines used in local traffic have no effect on the clearness of communication over long distances. In relation to clearness of conversation we can make a difference between long distance telephone lines and local traffic lines. In contrast to the isolated long distance lines, the full distance need not be utilized entirely for these public long distance lines.

The Permissible Weakening of the Lines: In contrasting isolated long distance lines and the ordinary traffic line we have seen that no general statements can be made that apply to them both. The development of telephony and the industries interested in it rests, however, in the first instance on the development of the great telephone systems that have often been concentrated into large units centering around some central point, like a large city. Corresponding to the size of the units the need for standardization is felt more and more, but these tendencies are only in the stage of evolution and the views concerning the selection of proper telephone lines differ very much.

The distance to be covered in conversation depends in the first instance on the volume of sound which is sufficient to carry over the distance involved. Accord-

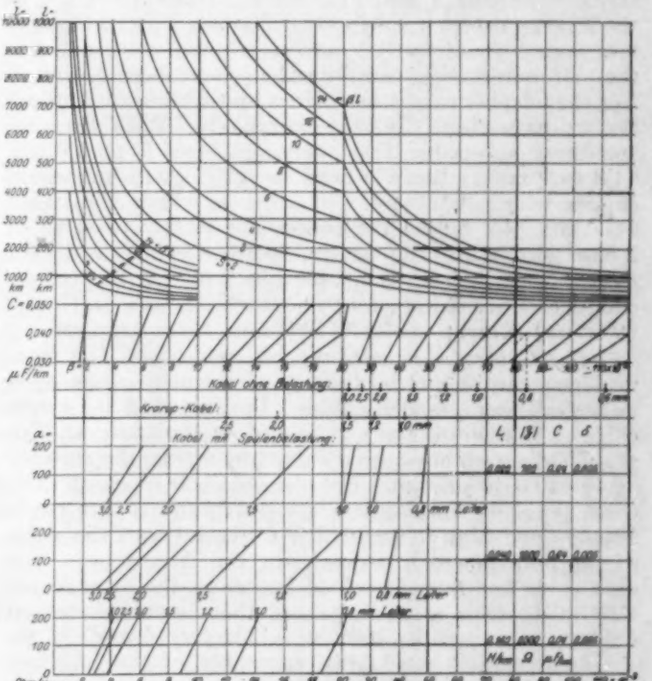


Fig. 1. Graphic Diagram of the Specific Damping Effect and Distances of Various Cables for the Frequency $\omega = 5000$.

ing to international agreement the communication is stated to be "satisfactory" when the weakening effect of the conversation over the long distance is $S = 3.0$ and when it is a question of a uniform line, $S = \beta l = 3.0$. In such a telephone line, even under the most unfavorable conditions the requirements for the permissible limit of weakening of telephone currents $S = 3.8$ are not passed. It has been avoided here, as also in the fol-

lowing computations to give to the well known numbers the designation "the βl," unless it is really the question of tangible values for β and for l.

Graphic Picture of the Distances Covered by Various Cables: (a) Ordinary cables and Krarup cables. Fig. 1 gives a graphic picture of the distances safely covered by various types of cables. In making this diagram it was assumed that the distance and the clearness of conversation was fixed and that the proper cable construction could be selected from this viewpoint. In the upper half of the figure, the length l in kilometers dependent on the damping effect β, i. e. the curve $l = \frac{S}{\beta}$ has been entered for several values of the weakening effect $S = \beta l$, in order to have the numbers for the distances on hand for the given values of the specific damping effect β of cable lines. For each of these cables the usual copper conductor, diameters of 0.8, 1.0 mm., etc., have been applied, the cables being the ordinary telephone cable, the Krarup cable and three types of cables using spools or coils as load. For capacity in every case the value 0,040 μF/km has been assumed as standard. Immediately beneath the first series of curves the dependence of the specific damping effect on the capacity has been reproduced. Thus it can be seen that the double wires of the ordinary imperial telephone cable with 0.8 mm. wire at 0.35 F/km. have a specific damping effect of $\beta = 0.0780$. According to the standards allowed, the proper distance to be covered is $L = 30$ km. (18 miles) and the proper length for the telephone subscribers' lines is 2 km. (1.2 miles), when $S = 0.2$. In the Krarup cables it is supposed that the wire conductors are wound about by 0.2 mm. iron spiral wire and for the self inductance, definite values have been assumed. For the telephone subscriber lines up to 3 km. (1.8 miles) the ordinary cables are used exclusively. With distances for these subscriber lines running from 3 to 15 km. (1.8 to 9 miles) there is need for cables with numerous copper wire conductors. In order to reach a distance of 7 km. (4.2 miles) the copper conductors must be of 2 mm. wire, unless the weakening effect is to pass the 0.2 value. In such cases Krarup cables with 1.2 mm. copper conductors are satisfactory and for distances of 15 km. (9 miles) Krarup cables with 2 mm. wires are used.

(b) Cable Lines with Spools or Coils: The same problems can be met by the use of cables using coils, or as we call them, loaded cables. In discussing the Pupin cables a few words have to be said in explanation. The graphic diagram has been obtained by setting the capacity again at 0.040 μF/km. For the common types of cable three types of construction are differentiated for weak, average and high loads, which differ through the value of the inductances laid down for the three types. For each cable line there is a load known as the most favorable load; with increasing load the distance increases only up to a certain limit, which is determined by the simultaneous increase of the resistance of the coils and through the conductivity of the wires. For wires with high resistance lower loads only are used, which have approximately the same distance of communication, as the increase up to the theoretical maximum value would require a very high demand of material and wire without any adequate gain. But even lines of low resistance are not benefited by using the maximum load permissible, which at times may make them seem to be inefficient. For this reason, the constructions with a low load factor have been added to the lines that are used up to their full capacity. The specific damping effect is then represented for the various cables, considering the effective resistance of the coils in such a manner, that for each conductor a part of a curve has been drawn, which shows the dependence on the coil constant for the limits to be applied. Thus it is seen in the diagram, that for the average load of a 1.2 mm. line, the specific damping effect decreases from 0.020 to 0.016, when the coils are brought from a = 200Ω/Henry to a = 30Ω/Henry. The distance for subscribers long distance lines will then lie corresponding to the weakening effect $S = \beta l = 3.0$ between 150 and 175 km. (90 to 105 miles).

Avoiding of Reflection Losses in Telephone Lines: It is easily seen why for the subscribers' telephone lines the most favorable loads do not come into question. With the small amount of the permissible total damping effect, it is essential, that reflection losses are avoided when connecting with other telephone lines, which in this case, depend on differences in the characteristic of the two lines. A weakening effect down to 0.6 might occur through reflection losses and that is, of course, out of the question. The Krarup cables are considered as especially applicable, as they have a comparatively low characteristic (400 Ω for 2 mm. conductors and 540 Ω for 1.2 mm. conductors). But there is no objection to choosing the characteristic even in loaded cables so low, if this property is the most important one, as is true in telephone subscriber cables. The first of the three types computed in the diagram corresponds to this requirement. The characteristic lies near 700Ω, for weaker conductors rising to almost 800Ω. The effect of this deviation from the value of 600Ω for ordinary cables and open wires is the same as with Krarup cables. The losses do not figure any further. The 1.0 and 1.5 mm. wires take the place of 1.2 and 2.0 mm. conductors. Since in the Krarup cables, the metal conductor, which determines the capacity and therefore also the cable diameter [in the usual iron wire spiral covered cables of 0.2 mm. iron wire], is 2.4 and 1.6 mm. in diameter, the cable cross sections can be reduced in loaded cable lines, by a ratio of about 0.4:1 and the conductor cross sections by 0.6:1. Even the lines loaded up to 1000Ω give no appreciable reflection losses with lines of 600Ω. They are to be considered in this regard of equal value with the 2 mm. Krarup cables.

Krarup and Pupin Cables for Subscribers Telephone Lines: With the low damping coefficient of the short length cables considered thus far, an extremely high coil constant offers only slight advantages when compared to the cost of installation and space. With greater coil constants the measure of distortion of speech sounds in communication may be greater than that found in Krarup cables. According to their electric properties, Pupin cables are, however, at least equal to the Krarup cables used for shorter distances. Consequently the cost factor will here be the decisive point. For Pupin cables there must be added to the installation and manufacturing costs the additional costs of boxes for the coils and installing them in city cable lines, which would be much higher than for Krarup cables or open wires. The smaller loads have the advantage, that the total load for a definite distance can be kept in a smaller number of localities and the distances between the various coils are also comparatively small. Various countries differ in the distances between coils. England, for example, allows a distance between coils of 6.6 km. (3.9 miles) while Germany requires a distance of 4.25 to 3 km. (2.15 to 1.8 miles) for cables with lower or average load. According to this there is a slight freedom for the dis-

tance between coils within which there will be no distortion of speech. The distribution can therefore be adapted to various conditions, which is very desirable for use in cities. For stretches that are considerably smaller than the distance between two coils (4.25 km.) a smaller coil inductivity would be chosen, or else Krarup cables might give better results. To bring about a contrast between Krarup and Pupin coils from their electric properties is not necessary.

In designing long distance subscribers lines one starts usually from the viewpoint of distance and determines the specific damping effect, so that $S = 3$ is not surpassed. Fig 1 shows various cable materials that would be suitable for this. In order to obtain a practical utilization of wire material, it was customary to try to save by loading the existing line material as high as possible. High values of the characteristic were unavoidable. A distance of 1000 km. (600 miles) could be reached only with great difficulties. Since this practice had reached its limit, there was a possibility to increase the distance for telephone work by the use of relays and repeaters and thus strengthen the telephone communication between far distant points. This element of the problem will be discussed in the next paragraphs.

Impossible Solution by Strengthening the Outgoing and Incoming Telephone Currents Alone: It seems queer that the telephone current strengthening devices, such as high tension current microphones and loud speaking telephones, had no decisive influence on the construction of long distance lines, especially since the demand for long distance lines grew year by year. Only on those lines that we might term "isolated" lines, namely, those communicating between two points at long distances only, could such devices be used with advantage. An extensive use of long distance lines is, however, thinkable only between points, like cities, where there is likely to be sufficient traffic over long distance telephone to pay for the cost of equipping the system for this kind of communication. For the local telephone calls, the ordinary telephone equipment is sufficient, and if we were to exchange all of these for long distance equipment, the communication between these local points would become unnecessarily loud, which must also be avoided. There remains only the general introduction of current strengtheners or repeaters with selective action and to install these, their manufacturing cost would have to be fairly low, which is unfortunately not the case.

In the second place, one might consider the problem of creating special long distance telephone lines which are used only for this kind of traffic and are equipped with sound strengthening devices. But if only the incoming and outgoing station is equipped with this type of apparatus, then only these two stations can communicate with each other. To introduce such a restriction on long distance traffic would not be advisable either. It is not a far-fetched idea to argue that it is this point which has failed to solve the problem of long distance communication by the use of high tension microphones and loud speaking telephones. The long distance telephone relay seems to be about the only solution for the question, in that it is possible to obtain long distance lines with sufficiently good communication and comparatively low costs. It is assumed that the effect is obtained on a duplex telephone system, as otherwise a doubling of the subscribers telephone lines would become necessary. One will then think of the creation of special telephone stations provided with the current strengtheners from which stations the subscriber can call up over long distance. Any desired subscriber in the long distance system can be reached without trouble, as the telephone currents leave after having been strengthened and are received in a normal condition, and vice versa, the currents arriving at the long distance station in a fairly weak condition through losses over long distance, are strengthened again before being heard by the subscriber.

Limiting the Strengthening of Sound: There is a limit to the strengthening of the telephone currents, beyond which there will be cross talking and noises. In constructing the cables and exchange equipment care has been taken that the densely numbered telephone lines do

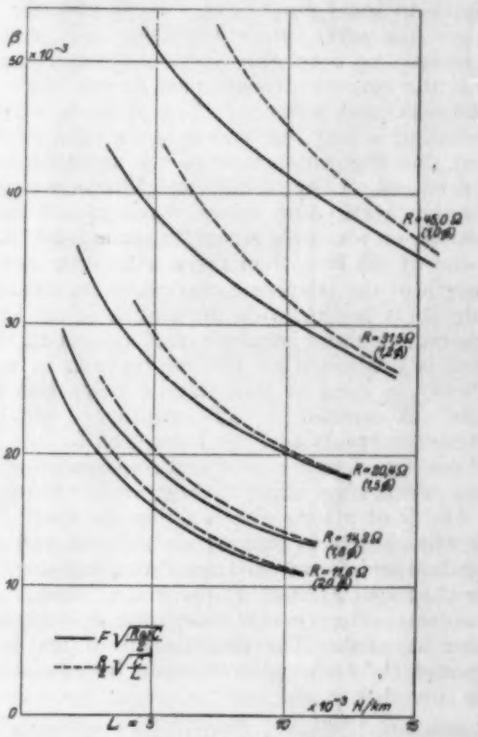


Fig. 2. Approach of the expression $\frac{R}{2}\sqrt{\frac{C}{L}}$ *to the specific damping* $\beta = \beta_0 f$ *with weak load* $C = 0.04\mu F/km$.

not disturb each other in any way. In order to limit the electric and magnetic fields of the current carrying parts in such a way that they will have no effect on neighboring lines, protective devices like metallic caps over relays and covering of telephone wires are necessary. Through this the strength of the effective fields in the neighboring lines is reduced down to the necessary minimum. The disturbance in the foreign line can be determined according to the weakening standards assumed for telephonic communication. If the weakening effect of a telephone current, $S = 4.8$ is not considered sufficient for communication on this line, the sound, however, is still of such volume that individual words can be understood. If a current of this strength enters a neighboring line, its effect will still be a disturbing factor. When $S = 6$, even a trained ear will not be able to understand anything in the line of disturbances and this factor $S = 6$ may be considered as the permitted upper limit. The experiences as to the state of the densely crowded lines in telephone exchanges are very poor, and it can only be said that in general the telephone lines have met the demands made on them and that disturbances in talking have in most cases been due to accidental injuries to the cable covering or to the protective devices that are in-

stalled for the purpose of preventing trouble. As far as there are actual measurements it may be said that the limit $S=6$ has in general been observed. If then the unweakened outgoing telephone current is strengthened by $V=2$, then there will be cross talk and noises. The volume of these noises will be practically one, which is sufficient for practical communication between two telephone subscribers, the weakening of the normal outgoing current being $S=6-2=4$. One must again decide whether it is better to rebuild the entire local and exchange system to meet the new condition in favor of the long distance lines, or else to adapt the long distance lines to local conditions. Here also the second solution is the more preferable, especially since very simple means can meet this end. All that is needed is not to let the current strength pass at any place beyond the usual maximum value. If $S=\beta l$ is the total weakening effect of a long line and V is the total strengthening effect, then the communication can be established with any desired subscriber in the long distance system, if the effective weakening effect $S\omega=\beta l-V=3$. If the repeater, or whatever strengthener is used, is placed at one end of the line, then there will occur at this end the strength of the telephone current strengthened by V. If the device is laid towards the middle of the line, then the greatest telephone strength that occurs in the line, drops and is smallest when the line repeater or whatever strengthener is used at that middle point between the terminals. A number of advantages are obtained, if strengthened currents of $V=3$ are used for the various lines where repeaters are used and consequently the lines have the weakening effect $S=\beta l=3$. Between the places *ABCD* of a long distance line the specific damping effect is chosen so that $\beta l=3$. In *B* and *C* there are repeaters which are used for through traffic. There is no need of special lines, as there is no danger of telephone noises. The regular telephone exchange equipment can be used. The distribution of the lines for through and for terminal traffic can be adapted to the needs at any time.

Limiting the Distance Obtained by Repeaters by the Distortion: There is a limiting of the possibility of strengthening the telephone currents through the fact that the telephone currents are composed of various constituents. The analysis of various current curves of the sounds of speech shows fundamental vibrations whose frequencies are wide apart. It has been found, however, that for transmission of speech a comparatively small frequency of 800/sec. is sufficient. Speech can be understood if the components of the telephone currents lie within these ratios. Telephone circuits meet this demand more or less satisfactorily. As measure of distortion of speech the difference between the specific damping effects at various frequencies has been adopted as standard. The distortion grows independent of the strengthening of the line with the length of the line. Ordinary cable lines distort speech very much, but through loading with self inductances this effect can be decreased. If the conduction were to have the nature of a pure (metallic) line, in other words, be independent of the frequency, then a load could be obtained, which would eliminate distortion entirely. Here we assume in addition that the resistance is independent of the frequency. Both assumptions do not correspond to actual facts. After a certain limit of strengthening of current, speech becomes inaudible and unintelligible, even if the proper frequency is brought to the sufficient strength of sound. It has been found that the higher frequencies are inaudible when the strength of their initial currents has been as strong or else smaller than that of the fundamental frequency. The possibility to reach any distance line by inserting as many repeaters as desirable is limited by the fact that the distortion U must not pass beyond the value 3. This factor then sets a certain limit to any telephone line as relates to distance.

The dependence of distortion on the properties of the cables cannot be considered without mathematical computations, which will be done in the next section. It might be said here that distortion is decreased by loading cables and that there are various favorable loads depending on conditions. When loading with coils one has the advantage of being able to control the distortion by choice

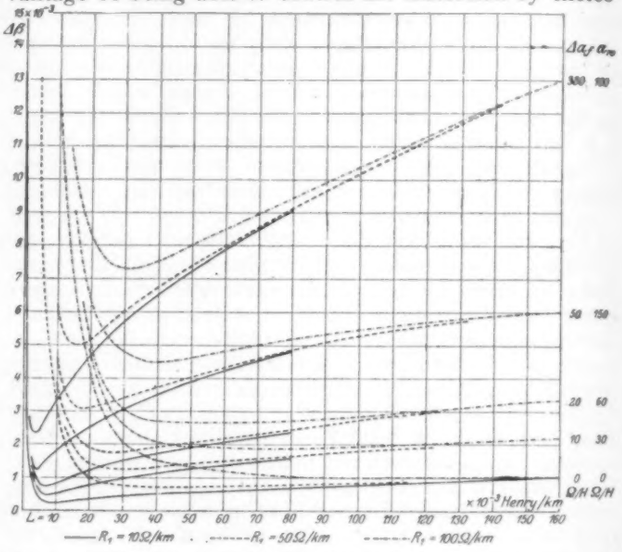


Fig. 3. Specific Distortion $\beta 10{,}000-\beta 5000=\Delta\beta$ for a few values of the Effective resistance R_1 with $\omega=5000$.

of coils. Krarup cables are equivalent to Pupin cables with coils of about the same quality. If electrical engineers should succeed in building repeaters that would always eliminate distortion quantitatively, then any line could be extended to any indefinite distance.

Computation of the Damping Effect: The computation of specific damping follows from the Maxwell field equation of:

$$\left.\begin{aligned} -\frac{\partial V}{\partial x} &= (R+j\omega L)\,I \\ -\frac{\partial I}{\partial x} &= (G+j\omega C)\,V \end{aligned}\right\}$$

Tension and current are assumed as changing ω-sine-shaped with the frequency. V and I are the vector symbols. The differential equations assume that the lines have the same properties in all parts and at all times. The properties of a unit of length of 1 km. are introduced by the expressions in brackets, which may be assumed as the apparent resistance of a short section of cable, $(R+j\omega L)$ for short circuit and $1/(G+j\omega C)$ for no-load conditions. *RLG* and *C* are the effective values for resistance, inductance, conductivity and capacity. The specific damping effect is then given as the real part β of the expression:

$$\gamma=\sqrt{(R+j\omega L)\,(G+j\omega C)}=\alpha j+\beta \qquad (2)$$

$$\beta=\sqrt{\frac{1}{2}}\sqrt{-(\omega^2 GL-GR)+\sqrt{(\omega^2 L^2+R^2)(\omega^2 C^2+G^2)}}\,.$$

The effective conductivity G is due to the energy losses in the dielectric, as whose measure the angle δ of the dielectric in the form of $tg\,\delta=G/\omega C$ is used. The con-

ductivity G is therefore for any given dielectric proportional to the capacity. As in terrestrial cables dry paper is used for insulation, the angular loss does not vary very much within the frequencies used, the conductivity is also proportional to the frequency. The angular loss is moreover so small, that $tg\,\delta$ can be replaced by δ and that we get the equation:

$$\beta = \sqrt{\frac{1}{2}\omega C\left(\sqrt{\omega^2 L^2 + R^2}\left(1 + \frac{\delta^2}{2}\right) - (\omega L - R\delta)\right)} \quad (3)$$

If we introduce in a similar way:
$\text{tg}\,\epsilon = R/\omega L$ or: $tg\,\zeta = \omega L/R$ then we have:

$$\beta = \sqrt{\frac{1}{2} R\,\omega\,C}\sqrt{\sqrt{1 + tg^2\,\zeta}\left(1 + \frac{\delta^2}{2}\right) - tg\,\zeta + \delta} \quad (4)$$

$$\text{and } \beta = f\cdot\sqrt{\frac{1}{2} R\,\omega\,C}. \quad (4a)$$

and for small self inductances we have:

$$\beta = \sqrt{\frac{1}{2} R\,\omega\,C}\left(1 + \frac{\delta - \zeta}{2}\right) \quad (5)$$

When passing over to large inductance values we have:

$$\beta = \sqrt{\frac{\omega C}{2}}\sqrt{\omega L[\sqrt{1 + tg^2\epsilon} - 1] + R\delta + \frac{\delta^2}{2}\omega L\sqrt{1 + tg^2\epsilon}} \quad (6)$$

and consequently for sufficiently small values of:
$\epsilon = R/\omega L$

$$\beta = \sqrt{\frac{\omega C}{2}}\sqrt{\omega L\frac{1}{2}\left(\frac{R}{\omega L}\right)^2 + R\delta + \frac{\delta^2}{2}\omega L}$$

$$\beta = \frac{R}{2}\sqrt{\frac{C}{L}}\left(1 + \frac{\omega L}{R}\delta\right) = \frac{R}{2}\sqrt{\frac{C}{L}}\left(1 + \frac{\delta}{2}\right) \quad (7)$$

$$\beta = \frac{\sqrt{C}}{2}(R/\sqrt{L} + \omega\delta\sqrt{L}) \ldots \quad 8)$$

The expression (3), (4) and (6) are equivalent to the equation (2) as only members of the magnitude δ^3 and smaller ones have been omitted. Equation (5) is only used for ordinary cable lines. The correcting member in the brackets can usually be neglected. (8) agrees with the usual expressions for high loading, as can be seen when the conductivity G with $\delta = G/\omega C$ is introduced. For lines with small load, as for Krarup cables, $\text{tg}\epsilon$ takes values near 1, so that no approximate value can be reduced from formulas (4) or (6). As a rule the influence of the angular loss with small and medium loads can be neglected. With increasing self inductance one approaches the values of equation (8) very quickly. Fig. 2 gives an approach for the expression $\frac{R}{2}\sqrt{\frac{C}{L}}$ to the specific damping effect $\beta = \beta_{of}$ with a weak load $C = 0.04\ \mu F/_{km}$. The angual loss is assumed to be zero. The capacity is assumed to be $0.04\ \mu F/_{km}$. In all expressions for β the root deduced from the capacity appears as a factor. It has, therefore, been possible to show the dependence of the damping effect on the capacity for all types of lines (Fig. 1). For several unit values of β, parts of the curve $\beta = \beta_o\sqrt{\frac{C}{0.04}}$ have been drawn into the diagram. The values for ordinary cables and for Krarup cables have been computed from equations (5) and (4a). The Pupin cables have been computed from (4a) and (8). The computations have been made as if the loads were uniform. It is therefore presupposed that the distance between coils is always sufficiently small. For the lines with coil loads the resistance of the various coils have been accounted for by portions of a curve, using for coil constant the relation a of the effective resistance of the coil to the self inductance for a frequency $\omega = 5000$. The relation of the "conductivity" is accounted for by assuming the constant value $\delta = 0.005$.

Computing the Distortion: The specific damping effect varies considerably with the frequency, the higher frequencies suffering greater dampings. It was pointed out before that the use of repeaters for greater distances is limited by the fact that the higher frequencies finally become so weak that speech becomes inaudible. When using repeaters and strengthened telephone currents, the total distortion is $(\beta_2 - \beta_1)\,l = U$. For very small self inductances, we obtain from equation (5) the equation:

$$\Delta\beta = \sqrt{\frac{C\,R}{2}}(\sqrt{\omega_2} - \sqrt{\omega_1})\left(1 + \frac{\delta^2}{2}\right),$$

and for greater loads, the equation:

$$\Delta\beta = \sqrt{\frac{C}{2}}(\omega_2 - \omega_1)\,\delta\sqrt{L},$$

can be used, when the effective resistance does not depend on the frequency. The specific distortion grows with the root from the capacity and the self inductance and with angular loss. If we form from equation (5) the distortion for small oads and differentiate according to L, then we have:

$$\frac{d(\beta_2 - \beta_1)}{dL} = -\sqrt{\frac{C}{8R}}(\omega_2\sqrt{\omega_2} - \omega_1\sqrt{\omega_1}),$$

which shows that the distortion decreases with the self inductance. For such determined values as δ, C, and R, there must be a load, at which the distortion has a minimum value. From δ, C, and L we can assume the independence from the frequency with sufficient accuracy, not, however of R. Due to eddy currents, and with the use of iron for increasing the self inductance, due to hysterisis losses, the effective resistance for the higher frequencies will be much greater. One must therefore form β_2 and β_1 for the various loads, to represent them as functions of R and then to form: $\beta_2(R_2) - \beta_1(R_1)$, where R_2 and R_1 are the effective resistances belonging to ω_2 and ω_1.

For larger loads the distortion is computed from the equation (8) and shows as:
$\beta_2 - \beta_1 = \Delta\beta$

$$= \frac{\sqrt{C}}{2}\left(\frac{\rho_2 - \rho_1}{\sqrt{L}} + (\omega_2 - \omega_1)\,\delta\sqrt{L}\right)$$

$$\Delta\beta = \frac{\sqrt{C\,L}}{2}\,\Delta a + (\omega_2 - \omega_1)\partial)\,.\,.$$

showing that the distortion grows with the root from the self inductance. Fig. 3 shows the distortion in dependence on the self inductance for a few values of the effective resistance R_1 with the frequency $\omega_1 = 5000$. Δaf gives the difference of the effective resistance for $\omega_2 = 10{,}000$ and $\omega_1 = 5000$, related to the unit of the self resistance.—*Elek. Zeit.*

Among workers there are two classes of temperament. One thinks his fellow workers are all getting a bigger salary than he; the other thinks they are all getting less.

Advertising as a System of Education

Part of an Address Before the Associated Advertising Clubs of the World at Philadelphia

BY N. C. KINGSBURY

THE need for national advertising is the natural result of the need of distributing overproduction. To distribute merchandise, widespread knowledge of the product is essential; therefore, it logically follows that advertising is a very important part of the system of education. The complexity of our modern life makes education through advertising an absolute necessity. We need a tremendous amount of information concerning things which we must have because of the requirements of our present civilization. Our lives touch so many and so varied interests at so many points of contact that without this form of education we cannot have the knowledge necessary for existence on the plane on which we now live. Every day we must have greater knowledge in order to keep up with the times. We may all start in on the system of education brought to us by advertising; none of us may over hope to finish the course. It is easy to matriculate, but impossible to graduate.

If we are to consider advertising as a system of education—and this we must do in the very nature of the case—then there is an immense responsibility upon all who are connected with advertising. He who buys the advertising as well as he who sells it should consider himself as a member of a great faculty, as a real leader and instructor of the people. If the text-books studied in this great university are calculated to mislead the students, if promises are made which cannot be fulfilled, if courses are offered and pursued which unfit the student for the practical things of life, the entire institution will be brought into discredit and disfavor and the business of educating through advertising will decrease rather than increase.

The history of national advertising records many instances where large sums of money have been thrown away in attempting to gain national recognition for something which had no national importance. That national advertising requires large sums of money goes without saying. The publications employed must have national criculation, and in order to support such circulation their charges must seem high. But there are other elements which must be observed in order to accomplish results in national advertising.

It takes time to be known all over a country as large as the United States; it takes persistence, determination, tremendous force behind an advertising campaign, and it also takes a willingness on the part of the producer and the advertiser to be known for just exactly what he is.

I am told by men of great experience in the advertising field that many a campaign of national advertising has failed because of the lack of persistence, because results were expected in too short a time, and instances have been cited where a campaign which might have been tremendously successful ended in failure because it was stopped just a little bit too soon. There is a tremendous cumulative force in persistent reiteration and presentation of a product which is naturally important, and when you have secured this accumulation of force, it is remarkable how long the benefits last.

I was recently told by an advertising man of many years of experience of a remarkable example of the continuing force of persistent advertising. There was advertised for some years a certain line of books. The line was well advertised, but the books have long been out of print, and there has not been a single advertisement for that line of books for forty-two years, and yet in all those forty-two years there have been inquiries coming to that man from those old advertisements, and last year three inquiries came from and referred to the advertisements which had ceased forty-two years before!

The corporation which I have the honor to represent and which spends large sums of money each year in national advertising, does not do so with the direct object of inducing people to subscribe for telephone service. Our president, Mr. Vail, has said to me over and over again, "You must keep out of your advertising anything in the nature of an invitation to purchase telephone service; get away from the commercial idea." Well, that is a pretty hard thing to do, but we have conscientiously tried to do it.

We advertise in a national way because we serve a nation-wide public, and we want that public to know all about our business. We have intricate problems. We want the people to understand them. We have lofty purposes, and we are entitled to have them known. You can readily understand that a corporation doing business in some 70,000 places in the United States needs some measure of sympathy from the public it is trying to serve, with its tremendous difficulties.

Perhaps the one great test that can be applied to our national advertising is to consider whether or not it has made these problems, purposes, ideals, difficulties, principles and policies known throughout the United States.

As advertising men, I am pleased to tell you that in our opinion our campaign in these particulars has been a success, and there are many evidences which go to confirm our belief in this direction.

Our national advertising campaign began in June, 1908. We will assume that the advertising has affected only the number of Bell telephones as shown in the annual reports of the American Telephone and Telegraph Company. The stations of our connecting companies, private line stations, etc., have been omitted in making up these figures. For the five years of 1904 to 1908, inclusive, we gained 1,690,078 subscribers, and this gain was 1.72 telephones for each 100 of the total population of the United States. That was before our advertising campaign began.

Now let us take the period from 1908 to 1913, inclusive, omitting, as you will note, the years 1914 and 1915, in order to avoid the effect of abnormal conditions due to the European war. During these five years, while our advertising campaign was in progress, we gained 2,199,964 stations, and that gain was 1.95 telephones per 100 of the total population of the country, so that during the period covered by our national advertising the gain in telephones was .23 of 1 per cent greater than during the period when we were not advertising. If you will apply this .23 of 1 per cent to the total population of this country you will notice it represents a large number of telephones. And this gain

was made in spite of the fact that the possibilities for new business were considerably less in the latter period than in the former period.

Eliminating the effect of differences in population the gain in Bell telephones in the United States was over two and one-half times the gain in the German Empire, over three times the gain in Switzerland and almost six times the gain in France.

All of you have probably been made aware that we have built a transcontinental telephone line extending from New York to San Francisco. It has been advertised in a national way by many different mediums, and this has had a very remarkable result on our long-distance telephone business. In the past year the average length of haul of all the messages carried over the lines of the American Telephone and Telegraph Company has increased nearly 24 per cent. Is this not a truly remarkable result of the education which the people of the United States have received through advertising the invention and development of the necessary facilities for long-distance telephony? There are probably few campaigns wherein it is as difficult to trace direct results as in that conducted by the American Telephone and Telegraph Company, but the above facts speak for themselves.

The statistics we have considered could be translated into the terms of the dollar, but it would be impossible to estimate the benefit which we have received because of the education of the public concerning our business. We cannot calculate the value of an enlightened public interest and knowledge in our affairs, but the benefits are apparent in various ways.

It is high time that the people of the world came to a realization of the tremendous scope of the advertising business of today. No longer is advertising to be considered as a superficial gloss upon business. It rather has to do with the very fundamental principles of every business. There is co-operation in this age—yes—but in order to share in the benefits of co-operation every business man must co-operate.

MINNESOTA TELEPHONE NEWS

BY THE MINNESOTA INDEPENDENT TELEPHONE ASSOCIATION

326 McKnight Bldg., Minneapolis, Minn.

PHYSICAL CONNECTIONS WHERE THE LOCAL COMPANY HAS AN EXCLUSIVE CONTRACT.

IN reply to a letter from H. Mork of the Aitkin-Deerwood Telephone Company at Aitkin, Commissioner Elmquist says:

July 25, 1916.

In answer to your inquiry as to whether the Northwestern Telephone Company will have any cause for damages if you should make a physical connection with the Tri-State Telephone Company at Aitkin without their consent, I beg leave to report as follows:

The Commission has reviewed the contract which you have entered into with the Northwestern Telephone Company, which provides that the Northwestern shall have the exclusive right to connect the exchange of the Aitkin-Deerwood Telephone Company with all outside points which are served by the Northwestern Company or its connecting companies and that no connection should be made with outside lines except through the Northwestern Company without its written consent. This contract, by its terms, became effective December 1, 1910.

A review of the decisions where contracts of similar nature had been passed upon show that the courts are not harmonious. Some of the earlier cases held that such contracts are valid and one or two more recent cases held that such contracts are void, as against public policy. Our own Supreme Court has not had occasion to pass upon the question. Our statute provides that:

"Whenever public convenience requires the same, every telephone company shall, for a reasonable compensation, permit a physical connection, or connections to be made."

And also provides that:

"Where the telephone companies fail to connect or agree upon the terms and conditions upon which the same should be made, an application may be made to the Commission."

The Commission finds it is unable to advise whether the contract is a legal instrument, but it does suggest that if your company is of the opinion that public convenience will be promoted by a connection with the Tri-State Company, at Aitkin, you should make it and then the Northwestern Company is in a position where it can, either by a damage suit or an injunction proceeding, try out the merits of the contract. It is better, in our judgment, for the public to receive service through this connection than to withhold such service pending the determination of the validity of the contract in the courts."

THE COMMISSION GRANTS APPLICATION OF THE TRI-STATE COMPANY TO INCREASE ITS LOCAL EXCHANGE RATES AT MOOSE LAKE.

A hearing in this matter was held at Moose Lake on June 27. D. M. Neill, commercial superintendent, appeared for the Tri-State company, while several parties appeared for the residents and business men of Moose Lake.

The telephone company owns and operates a local exchange at Moose Lake with 84 stations, and also connects with rural companies having 351 subscribers. The present net rates are as follows:

Business private line, $1.50 per month.
Residence private line, $1.25 per month.
Residence 4-party line, $1.00 per month.

The company asked for an increase of $0.50 for business and $0.25 for residence private line telephones per month. With the same number of telephones and class of service continuing after the increase, exchange revenues would be increased $24.25 per month.

This increase in revenue is asked for in order to take care of the necessary additional all-night service. At present time service is given from 7 a. m. to 9 p. m.

The patrons in Moose Lake insist on the all-night service and expressed their willingness to pay the increased rate in order to get it.

The Commission finds that the present net revenue will not permit of an allowance for depreciation and a return on the investment as shown to be $3,865.35, after deducting operating and other expenses.

After reviewing all the facts, the Commission was of the opinion that the application should be granted, and therefore ordered the increase asked for, to be permitted, effective September 1.

DISCRIMINATION IN LOCAL RATES BY THE NORTHWESTERN TELEPHONE EXCHANGE COMPANY AT SEVERAL OF ITS EXCHANGES.

In a letter from the Commission under date of August 18 to the Northwestern Telephone Exchange Company, it says:

The Commission is in receipt of complaint with reference to certain tariffs which you have published at Bird Island, Graceville, Granite Falls, New Ulm, Olivia, Sleepy Eye and Redwood Falls. The complaint is addressed in particular to that portion of your tariff which reads as follows:

"If the tolls for any subscriber, not including 'Other Line' and 'Messenger' charges, for the preceding month amount to, or

exceed $5.00, and the same are paid at the company's office on or before the 15th of the following month, a discount of the entire rental charge will be made."

Section 11 of Chapter 152, Laws of 1915, reads as follows:

"A telephone company may furnish service free or at reduced rates to its officers, agents or employees in furtherance of their employment, but it shall charge full schedule rates without discrimination for all other service . . . . ."

Under your published tariff the subscriber whose toll charges exceed $5.00 per month will receive the business or residence telephones free of charge for that month, while the person who does not use the toll line to that extent must pay the regular rental.

The cancellation of the rental charges under such circumstances is in effect giving free service, and is likewise a discrimination, and hence is in violation of the provisions of Sections 7 and 11 of the Statutes.

I am directed by the Commission to request that you cancel the foregoing provision of your tariff by the filing of new tariffs which will comply with the law.

ELECTRICITY KILLS TELEPHONE LINEMAN.

W. E. Beckley, a lineman for the Tri-State Telephone & Telegraph Company, St. Paul, was killed August 18, when 13,500 volts of electricity passed through his body while he was working at Broadway and Snelling avenues.

Beckley was helping string a wire over a street railway service line. Beckley was holding one end of a wire. E. C. Robertson, 1926 University avenue northeast, Minneapolis, threw the coil of insulated telephone wire over the service line. The insulation was not heavy enough to prevent a contact. The nails were burned from the soles of Beckley's shoes and a small black and blue spot indicated where the voltage entered and passed from his body.

LIST OF INDETERMINATE PERMITS GRANTED BY THE COMMISSION SINCE THE FIRST OF JULY, 1916.

Albany Telephone Company, Albany.
Blue Earth Valley Telephone Co., Wells.
Blue Earth Valley Telephone Co., Winnebago.
Blue Earth Valley Telephone Co., Elmore.
Blue Earth Valley Telephone Co., Guckeen.
Blue Earth Valley Telephone Co., Blue Earth.
Becker-Mahnomen Telephone Co., Detroit.
Becker-Mahnomen Telephone Co., Mahnomen.
Becker-Mahnomen Telephone Co., Calloway.
Bellingham Telephone Company, Nassau.
Bellingham Telephone Company, Bellingham.
Brownsdale Telephone Exchange, Brownsdale.
Brownsdale Telephone Exchange, Sargeant.
Brownsdale Telephone Exchange, Waltham.
Hills Telephone Company, Hills.
Jackson Telephone Company, Jackson.
Kimball-Maine Prairie Tel. Co., Kimball Prairie.
Long Prairie Telephone Company, Long Prairie.
Marietta Telephone Company, Marietta.
Melrose Telephone Company, Melrose.
North Star Telephone Company, Finlayson.
Northwestern Tel. Exchange Co., Owatonna.
Northwestern Tel. Exchange Co., Morris.
Pine Island Telephone Company, Pine Island.
Red Lake-Eastern Marshall Farmels Tel. Co., Goodridge.
Rochester Telephone Company, Rochester.
Rollingstone Telephone Company. Rollingstone.
Rollingstone Telephone Company, Altura.
Roseau Telephone Company, Roseau.
Standard Telephone Company, Preston.
Standard Telephone Company, Mabel.
Standard Telephone Company, Caledonia.
Tri-State Tel. & Tel. Co., Thief River Falls.
Tri-State Tel. & Tel. Co., East Grand Forks.
Tri-State Tel. & Tel. Co., Braham.
Tri-State Tel. & Tel. Co., Albert Lea.
Tri-State Tel. & Tel. Co., Graceville.
Tri-State Tel. & Tel. Co., Glenville.
Tri-State Tel. & Tel. Co., Greenbush.
Tri-State Tel. & Tel. Co., Cambridge.
Tri-State Tel. & Tel. Co., Hinckley.
Tri-State Tel. & Tel. Co., Foley.
Tri-State Tel. & Tel. Co., West Minneapolis.
Tri-State Tel. & Tel. Co., Grasston.
Tri-State Tel. & Tel. Co., Harris.
Tri-State Tel. & Tel. Co., Minneapolis.
Tri-State Tel. & Tel. Co., St. Paul.
Tri-State Tel. & Tel. Co., Mora.
Tri-State Tel. & Tel. Co., Milaca.
Tri-State Tel. & Tel. Co., Badger.
Tri-State Tel. & Tel. Co., Olivia.
Tri-State Tel. & Tel. Co., Rush City.
Tri-State Tel. & Tel. Co., Princeton.
Twin Valley-Ulen Tel. Co., Twin Valley.
Twin Valley-Ulen Tel. Co., Ulen.
Zenith Telephone Company, Duluth.
Zenith Telephone Company, Carlton.
Zenith Telephone Company, Cloquet.
Zenith Telephone Company, Proctorknott.
Zumbrota Telephone Company, Zumbrota.

ASSOCIATION NEWS NOTES.

ELMORE: It is reported that Judge Stevens of Boone, Iowa, is going to build an independent line into Elmore.

HENDERSON: The Northwestern Telephone Exchange Company has a crew in this vicinity working on improvements between the line from here to Fairfax.

COOK: The long distance telephone lines are completed from here to Rodger's and Cusson's farms, west of Cook.

HANSKA: The Hanska Rural Telephone Company is about to construct a line into LaSalle.

DEERWOOD: The Tri-State Telephone Company is building toll lines through here from Brainerd toward Duluth and the Northwestern Telephone Company is stringing a new direct toll circuit from Brainerd to points on the Range.

AITKEN (Spencer): The Farmers Club of Spencer has established a telephone line with the following officers: A. E. Achterkirch, president; R. C. Williams, secretary, and Peter Peterson, treasurer.

NORTH ST. PAUL: The Tri-State Company has a crew at work setting poles for the new line that is being extended to this village.

AITKEN: It is reported that the new toll circuits of the Tri-State Company between Brainerd and Duluth by way of Moose Lake may connect with the Aitkin-Deerwood Telephone Exchange here.

BARROWS: A representative of the Minnesota Telephone Company was here a short time ago looking up prospects for establishing their line into town.

HIBBING: A company is about to be organized to build telephone lines from Hibbing to Bear River.

NEVIS: E. L. Harmer has purchased a half interest in the Nevis Telephone Company.

BRAINERD: Incorporation papers have been filed by the Long Lake Cooperative Telephone Company. The capital stock is $1,000; incorporated by Peter Madsen, J. P. Jenson, H. M. Hughney and others.

ROUND LAKE: Work has been commenced by the Western Electric Company to re-build their entire system at Lake Park.

AITKIN: The Aitkin-Deerwood Telephone Company has surrendered to the village of Aitkin, its franchise and received in its stead, an indeterminate permit to the state Railroad & Warehouse Commission. This now places the company under the control and jurisdiction of the Commission.

MONTICELLO: The Northwestern Telephone Company is overhauling its Monticello local plant.

KELLIHER: The farmers of North Kelliher have organized a rural telephone company with the following officers: R. N. Holt, president, and Fred Dorenkempter, secretary and treasurer.

ADA: The farmers in Wild Rice township have organized and are about to build rural telephone lines. Andrew Rude, president; Carl Johnson, vice-president, and Mike Hammer, secretary.

An Improved Dry Cell Battery

Description of a New Type of Construction, from the Scientific American

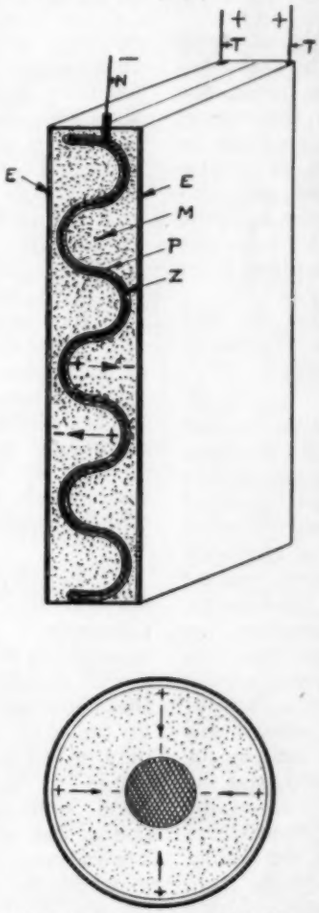
BY H. R. PALMER

THE modern dry cell is a development of the old Gasner Leclanché type, rendered more efficient by reduction of internal resistance and increase of the depolarizing effect, together with the incorporation and retention of a greater percentage of electrolytic solution. The careful selection of pure ingredients has also been an important factor.

Realizing that an inherent change in the construction of dry cells was necessary in order to attain any further marked improvement, the writer devised an entirely new method of construction, abandoning the familiar round type of zinc container and adopting a flat type similar to the lead plate construction of the storage cell.

The positive element consits of a zinc sheet, *Z*, encased in a porous envelope *P*, completely surrounding the same, and imbedded in the electrolytic and depolarizing material, technically known as the mix *M*. Next to the mix lies the negative elements or electrodes *E E*, which, taken as a unit, form the container of the cell. Thus the current generated on the zinc element has two paths through the mix (as shown by arrows) to the electrodes, which act merely as non-corrosive collectors, and emerges at the terminals *T T* which, connected together, form the positive pole of the cell, the zinc terminal *N* being the negative pole.

It will be seen that this is a reversal of the common round cell, in which the carbon rod electrode is the center and the zinc the outside container.



Above, New Form of Dry Cell Battery. Below, Section of an Ordinary Round Cell.

The greatest difficulty to be overcome in the production of the flat cell type was the formation of the flat type electrodes *E E*. Carbon plates were found to be prohibitive, owing to the high first cost and the fragile nature of the material. The comparatively high resistance of carbon also caused an uneven distribution of current, the portions nearer the poles *T T* supplying much more current than the diagonally opposite corners. The electrodes as now constructed in this cell are of such a low resistance (considerably under 1/1000 of an ohm) as to give a uniform current distribution. They are flexible, unbreakable and non-corrosive and very thin, about 1/32 inch.

Since the distance separating the zinc element from its container remains constant, the output of the cell varies directly as its area and weight, whereas, in the round cell, the increased size of can in diameter increases the resistance and amount of material in a much greater ratio than the output. For instance, the 8-inch round cell weighs 250 per cent more than the 6-inch, but is only about 50 per cent stronger electrically. This new flat cell 7 inches by 9 inches by 1 inch weighs 300 per cent more than the 4¼ inches by 5 inches by 1 inch, and is exactly 300 per cent stronger. Another great advantage of this cell lies in the greater depolarizing power of the mix, owing to the greater contact area of the zinc element with the depolarizer. This is a corrugated sheet and presents 40 per cent more area than the equivalent round cell. The current density of the dry cell should not exceed 0.013 ampere per square inch of zinc depolarizing surface to obtain economical service. The life of a dry cell does not vary in a direct ratio with this current density, but approaches more nearly the law of inverse squares, i. e. the life of a given cell supplying 0.013 ampere current density would be nearly four times longer than the same cell supplying 0.026 ampere current density. Following the above law an increase of 40 per cent area means an increase of life of about 96 per cent, which accords approximately with the results found under test.

These cells at present are manufactured in unit batteries of 2, 3, 4, 5, 6, 7, 8 cells connected in series and sealed under pressure in waterproof non-corrosive containers and occupy much less space than an equivalent number of round cells, and have only two connecting posts, regardless of the number of cells in a battery. They occupy much less space, weigh less and will not deteriorate under moisture. In fact, will operate equally well in the air or submerged in water.

Owing to the lower internal resistance, the short circuit test shows about 75 amperes. The voltage is the same as the round cell as the electro-chemical reactions are identical.

The round cell container being zinc, which is the fuel supplying the electrical energy, becomes thinner with use and will eventually be eaten through in spots. The cell is then rendered useless and the remaining zinc and other materials become waste product. Whereas in the new flat type the zinc sheet can be entirely consumed and will deliver current up to the last, the cell on dissection showing no zinc whatever within the porous envelope. The cell, owing to its greater depolarizing area, maintains a higher voltage under load than the round cell, thus rendering better service as well as longer life.

A petition was filed last month in district court by Attorney Thomas J. Davis, representing the Independent Telephone Company, Butte City, Mont., asking permission to dissolve and go out of business. The Independent company was absorbed by the Mountain States Telephone Company and, according to the petition, at the present time has neither liabilities nor assets. The money realized by the sale of the business and building on West Granite street was distributed by the directors to the stockholders.

Guiding Trains by Telephone

The Western Electric News Records the Advance of the Art in Railroad Practice

By W. A. WOLFF

IF the unforeseen never came to pass upon a railroad, instead of coming to pass nearly every hour of the day and night—there might be no such officer as the train-dispatcher, and no great need for telephones along the great steel highways of our country. But the emergency, the special, unusual case, does arise so often in the handling of trains—our great systems so swarm with limited flyers, fast freights, extra sections and private specials—that the guiding of trains today is a titanic task, requiring the best of efficient equipment *plus* brains and steady nerves on the part of the train-dispatchers and operators.

Go back to the early days and of course you will find no complexities in the directing of trains. Primitive railroading was an extremely simple proposition.

THE FIRST LOCOMOTIVE

When the first really successful locomotive, capable of pulling cars, was started on the Baltimore & Ohio lines in 1830, the problem of dispatching the train was simply one of making sure that the track was clear as far ahead as the engine driver could see. The train started when it was ready and reached its destination when it got there. There was no schedule and there could be none because of the uncertain operation of the locomotive mechanism.

As soon as the "railway mania," as railroading was called in the early days, seized the country and the railroad companies began to run two trains on a single track road at the same time, starting from opposite ends of the line, it became necessary to devise a scheme for keeping the trains from meeting each other head on or else meeting at some point where neither could pass the other. To avoid these things, trains were run on the "time interval" system. Some of the old timers will remember this as the system under which the ruling train had the right of one hour against an opposing train of the same class. If the latter did not appear within the hour, the train left the siding and went on, sending a flagman some distance ahead as fast as his legs could carry him, to flag the opposing train. When the two came within sight of each other, one of them had to go back into the nearest siding. Obviously, a great deal of time was lost with this very crude system if trains were late—a not uncommon occurrence.

In 1850, the telegraph lines, which up to that time had been used only for the carrying of commercial messages, inspired Superintendent Charles Minot of the Erie Railroad with the idea which led to the development of the telegraph dispatching system. After a year of successful experimenting on the Erie, a systematic attempt was made to telegraph train orders to trainmen and conductors from a central point, and from that time until the latter part of 1907, practically all train movements were directed by means of the telegraph.

ENTER THE TELEPHONE—1907.

The introduction of the telephone into the world of business resulted in its speedy recognition as an indispensable asset in the successful economic and efficient conduct of both large and small business undertakings. There was, however, one essential thing lacking, without which the maximum benefits obtainable in a commercial telephone system could not be secured in connection with the handling of train movements. This one thing was a means calling, quickly and reliably, any one of a number of way-stations located in a dispatching district or division, without interfering with any other station in that district.

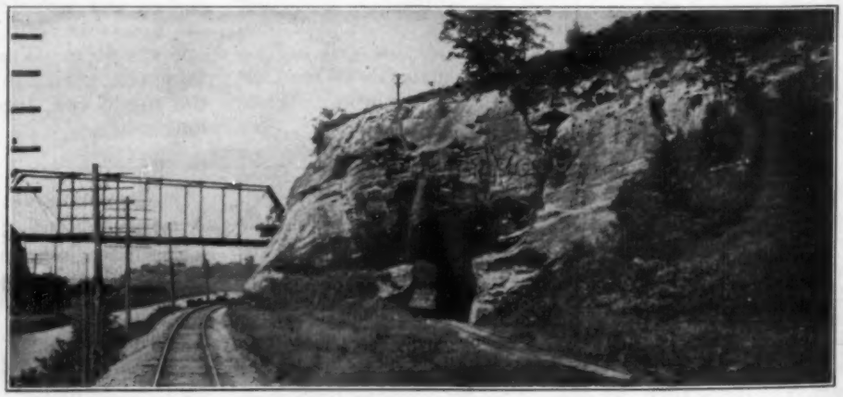
The selector was the result.

It may be pertinent at this point to correct an impression that may have been formed, for some reason or other, that the selector and telephone, as a system, are of a complex nature. That this is emphatically not the case, has been proven conclusively by the fact that selector systems have, in many instances, been installed and maintained with the most satisfactory results by men already in the employ of the railroads, although they may have had no previous experience in the use of this type of equipment.

THE SELECTOR'S WORK.

The telephone train dispatching line is nothing more nor less than a party telephone line extending from the dispatcher's office to the various way-stations on his dispatching division. It consists of a metallic telephone circuit to which certain calling apparatus is connected at the dispatcher's office and an individual selector at each of the way-stations, in addition to the telephone apparatus. The calling apparatus at the dispatcher's office is so arranged that a predetermined number of electrical impulses may be sent out at will to signal any one of the way-stations. This apparatus consists of a key cabinet, placed within easy reach of the dispatcher, in which there are a number of keys, one for each of the way-stations. These keys are so designed that the number of impulses sent by any one of them will actuate the corresponding selector at the way-station that is wanted. Therefore, when the dispatcher operates a key only that station is called, as the selectors at the other stations are so arranged that they will not respond. The average time required for the dispatcher to call a station is approximately three seconds.

The flexibility of the telephone system also makes



it possible to secure additional through telegraph and telephone circuits between terminal points or division headquarters without the expenditure of a single dollar for increasing the outside wire plant. This may be accomplished by simplexing and phantoming the train dispatching circuits.

A simple circuit is a telegraph circuit obtained by connecting repeating coils or retardation coils to the telephone circuit. These coils make it possible to carry on simultaneous telephone and telegraph communication over a single pair of wires without interference.

A phantom circuit is a circuit obtained by connecting repeating or retardation coils to two existing metallic telephone circuits in such a manner that a third through telephone circuit is provided over the two pairs of wires. In this way, three telephone conversations may be carried on at the same time over the two original circuits. Practically every railroad having message or commercial circuits paralleling their train dispatching lines is utilizing these wires to secure an additional circuit by means of the phantom.

THE FIRST INSTALLATION.

In October, 1907, the first successful installation of telephone and selector equipment for train dispatching was completed on the lines of the New York Central. This was closely followed by a number of installations on the Chicago, Burlington and Quincy, where it was proven, to the satisfaction of officials of other roads watching these first service tests, that the telephone and selector combination could be used equally well for single track as for double and multi-track operation.

These pioneers in telephone dispatching blazed the trail for the network of railroads traversing the United States and Canada. Out of a total of 285,000 miles of railroad in the two countries over 95,000 are now equipped for this method of handling train movements. Not only is the telephone and selector equipment used on the train wires, but similar apparatus is used on message wires for the transmission of messages other than those relating to train orders.

TELEPHONE AND TELEGRAPH.

When the first general move was made toward the substitution of the telephone for the telegraph to dispatch trains, dispatchers and operators viewed the new order of things with a great deal of suspicion. There was a feeling that the passing of the telegraph would endanger their positions, but developments have shown these fears to be unfounded if for no other reason than that operating efficiency makes necessary the employment of men who know the ins and outs of the game.

Men who have, in the natural course of events, developed that infirmity known as "operator paralysis" are most extravagant in their praise of this system which gives them, as some have expressed it, a new lease on life. It also opens up a field for trainmen and other employes who, as a result of accidents, are incapacitated for the work they previously performed.

A comparison of the telephone and telegraph systems in operation will show many advantages for the former.

With the telephone, the dispatcher issues orders verbally, using the same terms and forms as he would with the telegraph, his speed being limited only by the rate at which the operator can copy the messages. The average railroad telegraph operator sends at the rate of 25 words a minute, while a speed of 100 words or more is possible with the telephone. It is only natural, therefore, that more business can be handled by the operators with less physical effort. Complete reports of the passing, arrival or departure of trains can be given in the fractional part of a minute and information regarding accidents and other occurrences outside of the daily routine sent to headquarters verbally in such complete form that the chances of misunderstanding and the necessity for additional messages are eliminated.

When the dispatcher wishes to call, he turns a key corresponding to the station with which he wishes to communicate. The loud ringing bell at the station called insures an immediate response, whereas the comparatively feeble click of the telegraph relay or sounder frequently causes a delay in answering. Furthermore, other stations may be called in on the line while a message is being transmitted. This is a feature used continually on heavy traffic divisions where there is a high rate of calling.

Accuracy in transmitting orders is assured by the practice of having the dispatcher write down the words as they are spoken and checking this record, word for word, as the order is repeated back by the operator who has previously written it down simultaneously with the dispatcher. With the telegraph, the dispatcher writes down the order only when it is repeated by the operator and may not catch the errors in the repeat due to the natural impulse to write down the message as originally sent out by him.

This greater accuracy is directly responsible for the fact that since the telephone has been adopted for directing train movements, not a single accident has resulted from its use. The ease and speed with which the dispatcher can handle his work, is a further guard against accidents. There is more time to lay out work and plan meeting points, thus relieving the dispatcher of the mental strain engendered by trying to keep things moving and the almost continued strain of operating the telegraph key. This physical strain has, in the past, been a prolific source of wrecks and other traffic disturbances.

IMPROVED FORM OF THE SELECTOR.

With five years of experience to work upon the engineering departments have discovered new ways of improving the train dispatching selector. Development has been continuous and has reached its highest point in the latest type selector.

OTHER USES OF THE TELEPHONE IN RAILROADING.

The use of the telephone is not limited to the dispatchers and station operators. Portable telephones are supplied to crews of passenger, freight and wreck trains. They put the crew in immediate touch with headquarters in case of a breakdown or other accident occurring between stations. With the telegraph, it is necessary to reach the nearest telegraph office. The portable telephone has proven a great aid in the work of construction and bridge gangs. The foreman, by calling up the dispatcher periodically, can lay out the work of their crews to fit in between the scheduled passing of trains. They can also, if necessary, order and obtain additional supplies quickly. Another and possibly more important service performed by the portable telephone is found in its use by track inspectors. There are many instances recorded in which serious accidents have been averted as the result of a message sent over the telephone wires by inspectors who have discovered washouts, loose rails, land slides or any of the other sources of track trouble, which, if not discovered in time, would have caused wrecks and loss of life.

Telephones at sidings are also of great value in that

they enable the train crews to keep the dispatchers advised of their movements. On single track roads they are practically indispensable for maintaining a clear right of way. Some of the single track railroads that carry great quantities of perishable freight find in the siding telephones the one way to facilitate shipments. As the trains carrying this class of freight must be moved rapidly the freight conductor can, by getting his instructions from the dispatcher, leave a siding and follow directly after the passenger trains. In this way costly delays are avoided and better service given to the shippers and consignees.

As a result, the use of portable and siding telephones in connection with the regular dispatcher and way-station telephone apparatus has been a great factor in increasing the operating speed of the railroads that have adopted the telephone method for controlling train movements.

Railroad officials, who travel over the road a great deal and have not had experience in sending messages via the Morse code, have found the telephone a great boon. Telephone equipment designed especially for the purpose enables them to maintain as close a supervision over the affairs of the road from their private cars as if they were directing affairs in their private offices at headquarters.

SIGNALS OPERATED BY SELECTORS.

Selectively operated semaphores have also been installed by a number of railroads. The semaphore arms are operated through a local circuit which is energized by a selector connected to the train wire. An answer-back signal automatically notifies the dispatcher that the semaphore has been operated. The selector and telephone apparatus mounted in a weatherproof compartment in the body of the semaphore mast enables the dispatcher to set the semaphore against a train and have the conductor telephone for orders.

THE SPREAD OF THE TELEPHONE METHOD.

There are now about one hundred and thirty-five railroad systems in the United States and Canada that have adopted the telephone method of dispatching trains. The total number of miles covered by the telephone train dispatching circuits at that time was approximately 95,000 with seven hundred and eighty circuits in actual operation. While the use of this method of controlling train movements has not yet become as wide-spread in other parts of the world as it has in the United States and Canada, there are sixteen railroads, widely distributed over the globe, that have also adopted it. The telephone circuits installed on these sixteen roads number twenty-nine and cover over 1,400 miles. These railroads are:

American Smelting and Refining Company (Chile, S. A.)
American Railway of Porto Rico.
Bombay, Baroda & Central Indian (India)
Great Northern (London, England)
Indian Northwestern State Railway (India)
Italian State Railway (Italy)
Italian Westinghouse Company (Italy)
South African Railroad (Johannesburg, Africa)
Lancaster & Yorkshire (England)
London & North Western (England)
Metropolitan Electric Supply Company (England)
Midland Railway (England)
Northern Railroad of Costa Rica
Pacific Railway (Buenos Aires, Argentine)
Société d'Electricité de l'Oceanie Française (Tahiti)
Taff Vale Railway (So. Wales)

"If the Shoe Fits"

O you people who answer telephones! We have a bone to pick with you. We do not mean "telephone girls," "centrals," or "switchboard operators." They are not the ones whom we call up and, although it is very pleasant to have them connect us in a courteous, often delightful, tone of voice, we are not disgruntled if they fail to speak sweetly.

But you men who sit in the inner offices, you managers, you buyers, you sellers, you secretaries to the higher-ups, it is you whom we want to hear answer over the 'phone as if you were talking to a human being—not an intruder or a yellow dog.

There is just a possibility, you know, that some of the people calling you up over the 'phone are not doing it just to waste your time or make you mad. They may wish to do something for you. And they are much more likely to do it if you greet them at least with non-committal pleasantness than if you bark at them. Even if they are only interrupters or beggars, it is just as easy and much wiser to turn them away graciously than to snap their heads off.

It is foolish for the men half way up the ladder to feel that courtesy, affability, and efficiency are only for office boys and stenographers and switchboard girls.

I used to wonder how a certain young lawyer of my acquaintance had made such a rapid rise in the world. But one day in talking to him over the 'phone, a probable reason occurred to me. He does a great deal of business over the 'phone and he has a perfect telephone voice and manner. When he takes down the receiver and says "Hello," you feel as if the sun had just come out. There is no obsequiousness, no boot-licking about it, just a good hearty voice as of a strong, energetic man who is capable of doing anything and will probably be glad to do it.

I have had telephone conversations with men who sounded as stern and terrible as if I had just dragged them out of bed on a January night, and with others who sounded like brothers mighty glad to hear from me, however busy they might be, and who were sure I was bent on doing them a favor instead of an injury by calling. Some men must be very timid souls inside—they put on such big bulldozing voices outside. It is not the girls who need to learn how to behave over the telephone, it's the higher-ups.—*Ford Times.*

Chicago Automatic Case at Washington

A hearing was started August 28 at Washington, D. C., before G. Carroll Todd, assistant to the attorney general in charge of trust prosecutions, on the question of allowing the Chicago Telephone Company to absorb the Automatic.

The American Telephone & Telegraph Company avoided prosecution under the Sherman law three years ago by reorganizing, divorcing the telegraph interests and agreeing not to absorb any more competitors.

Besides the Chicago Telephone Company and the Automatic Company, Independents in Illinois and adjoining states are represented by former Congressman O'Hair of Illinois, representing the Kinloch and other independents, as their counsel.

The Independents are willing the Bell should absorb the Automatic if the Bell is required to give them Chicago connections which they now have with the Automatic. Otherwise they will fight the purchase on the ground that it would be a violation of the Bell agreement with the department of justice.

New England Finances

The New England Telephone Company reports gross earnings of $1,750,624 for June, against $1,562,281 for June last year. Net earnings were $537,730, against $468,087, and the operating income was $434,870, against $372,204. For the first six months of the year gross earnings were $10,163,131, against $9,055,139 for the same period last year. Net earnings were $3,059,030, against $2,662,385, and the operating income was $2,458,772, against $1,264,996.

Collection Efficiency

Read at the Convention of the Southern States Independent Telephone Association

By B. A. GRANT

IN all our vast telephone industry, the subject as set forth in the caption of this paper is beyond question the most vital essential to its life and success. Common sense, however, forbids an expatiated discourse on the numerous phases of theoretical collection efficiency; but rather prompts a briefly written account of real tangible results as obtained by a practical, efficient method of collecting for telephone service within our own immediate range of vision.

Some few years ago the writer became affiliated with what was then a considerable sized Independent telephone system of exchanges and toll lines, operating within the boundaries of this Southern States Association. To a general observer, this organization was running along smoothly and apparently netting a succes, but to the more technical eye of a newly organized management a marked leakage in many lines of its efficiency sprang up as an obvious loss. And perhaps the most noticeable of all these deficits was the very low collecting standard then in use. The average monthly collecting efficiency of the above mentioned company, at the time referred to, was not above 84 per cent, with one-half of its exchanges falling below 75 per cent. Today, this same company shows an average collection efficiency of about 97 per cent, and for the just preceding month, as shown by its official bulletin 14 out of 22 exchanges collected 100 per cent of their gross charges, with the general average of 96.4 per cent for the entire system. How this perceptible rise was brought about and a respectable average maintained will constitute what follows of this brief, though somewhat personal paper.

Realizing that before satisfactory collection for any salable product can be made, the purchaser must actually receive and be convinced that he is receiving full value for his money, the management set about to standardize the exchange and toll line service to a degree which made it consistent to expect immediate payment for service rendered. And since SERVICE is telephony's sole product, it should not be necessary to comment on the absolute necessity of perfecting a testworthy grade of such service, before any further successful steps can be taken. Then a vigorous campaign was inaugurated to establish a wholesome co-operation between the local exchange manager, the general office and the people; with the pointed anticipation of educating both the local manager, who has direct charge of the collection, and the subscriber from whom he has to collect, into the imperative necessity of prompt payment of all dues.

The generating power for an organized efficiency in this, or a similar telephone company, must have as its basic principle a system of complete co-operation between its local representatives and the policies of the general office; the man who has to deal directly with the public must be made to feel that the success of his exchange depends largely upon his personal ability, and when he fails to grip the situation and manifests an eagerness to move forward with the utmost help from the general office, he is quickly appraised a dead one, and soon replaced by one at least willing to do what he can. The big work in the promotion of such a co-operation lies within a company's ability to implant a spirit of individual enthusiasm among its men which will really be productive of practical results; and this work often requires diplomatic measures to meet the many varied conditions. In other words, the thought we wish to impress is simply that if an organization can bring its men really to feel a heart interest and actually want to collect 100 per cent of their charges each month, the efficiency problem is already solved. For any man with ordinary business ability can do the thing if he finds within himself a keen desire.

But, going back to our account of this particular company's work. In its original appeal for renewed energy in this collection efficiency possibly more emphasis was placed on the art of simple, unobtrusive business courtesy than any other one point, always impressing upon its employes that to avoid antagonism and make friends for the company is to make money and that this is an easy task for any manager who will produce real telephone service, attended by even an ordinary amount of outside business courtesy. It then made it a point to see that all bills for collection were in the hands of the local exchange not later than the morning of the first, with explicit instructions that each and every item be presented for payment as soon as possible after that date. And where an exchange seemed slow to fully grasp this new progressive movement a live man from the general office was sent immediately to that exchange to systematize and start a sample of the work demanded. This prompt, brisk method soon found many of the old slow payers ready and waiting with the cash; and now in many of the exchanges a major portion of the charges are reported paid by the 10th inst.; thus allowing the local manager the balance of the month on his other necessary work. On about the 11th inst. the subscriber's ledgers are run through at the general office and an accurate list given each manager of his unpaid accounts, never allowing him to overlook the most insignificant items and always giving special instructions on any abnormal balances. The balances are carefully followed up until adjusted, for if a sufficient number of them are allowed to run over to reduce one's efficiency below 93 per cent it is reasonably certain that they will ultimately be settled by partial payment and rebate.

Then, to inject something of the contest spirit, an official collection bulletin is rendered at the end of each month, showing the standing of each exchange and of course the 94 per cent man is stimulated by the 99 or 100 per cent place just one step higher up, and when these high marks are once reached by the men, they find their accounts so well cleared up and free from old disputed balances, that each month this work becomes easier than the last, and presently a satisfactory monthly average is attained. Doing a thing well one time develops with the doer a higher conception of efficiency, and increases his capacity for doing whatever task he may undertake.

Finally it would seem that collection efficiency in its fullest meaning can only be realized by those Independent telephone companies whose business policies stand steady in their demand for real service, honest co-operation and prompt courteous attention to all accounts due.

Pulling in Lead-Covered Underground Cables

A Practical Discussion from the Electrical Review and Western Electrician

By H. S. PERCIVAL

THE demand for subsurface construction in cities and improved suburban localities has involved many difficulties, particularly in connection with the installation of underground electric communication and power systems in which the maintenance of a high degree of insulation is a vital factor. When such systems were first installed the methods were crude, costly and none too reliable, but gradually satisfactory schemes were worked out, special tools and appliances developed and at length a whole new industry has been created.

In the early days various materials were employed to insulate and protect the conductors but now lead-covered cables are almost universally used, and with the demands for a large number of conductors in telephone and telegraph working and the necessity of transmitting heavy currents in modern power systems, these cables are frequently quite large. The "pulling in" of a large lead cable not only requires considerable power, but extreme care is essential to prevent injury to the sheath, which would permit the subsequent entrance of moisture and cause the failure of telephone cable, and in power work even more disastrous consequences.

The practice of pulling-in cables by hand windlasses has been generally abandoned as too slow in jobs of any magnitude and reliance is now usually placed on small portable winches driven by some form of gasoline engine. Several manufacturers of motor vehicles now offer trucks of from one and one-half to five tons capacity equipped with a winch which may be operated from the truck engine. Winches mounted on horse-drawn trucks and geared to gasoline engines also mounted on the truck are quite satisfactory. The engine may be either of the stationary type with hit-or-miss governor, or of the marine type with throttle control. The latter type is ordinarily smaller, but in either case the outfit usually takes up most of the space on the truck and the transportation of tools or material is correspondingly limited, whereas in the case of the automobile truck only a small portion of the floor space is occupied by the winch.

Engines of from 5 to 15 horsepower are usually employed, except in the case of automobile trucks, where

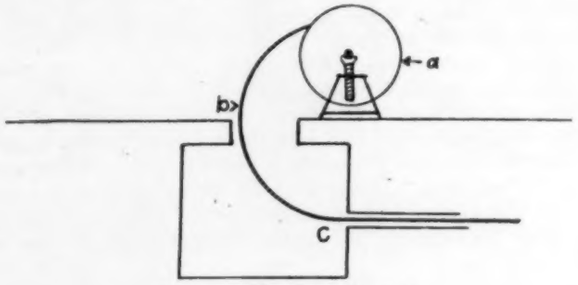


Fig. 1.—Position of Cable Reel.

the engine power is governed by the requirements of the truck rather than by those of the winch. Whatever the source of power, the gear ratio should be such as to give a peripheral drum speed of from 50 to 90 feet a minute. Slower speeds require too much time for pulling-in, and higher speeds do not permit of proper inspection of the cable as it comes off the reel. Furthermore, with high speeds, if the cable binds or jambs at the duct entrance, serious damage is liable to be done before the pulling-in can be

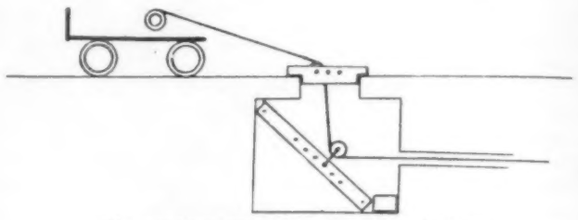


Fig. 2.—Arrangement Requiring Two Pulleys.

stopped. All winches should be equipped with a friction clutch so that the drum can be stopped or started independently of the engine.

Previous to the pulling-in it is necessary to rod the duct to be used in order to establish a line by which to draw in the pulling-in rope. This is ordinarily done considerably in advance of the pulling-in so as not to delay that work. Various types of jointed rods are on the market. Some terminate in threaded brass nipples, a male thread on one end and a female thread on the other, but more commonly some form of patented interlocking joint is provided which permits of more rapid connection and disconnection than with the screw type. The rods are pushed into the duct from one manhole and where they appear at the adjacent hole a wire is fastened to one end and pulled in.

Where more than one length of conduit is to be rodded and where the ducts on one side of the manhole register with those on the other, the rods are not unjointed at each manhole but are pushed through from one length of duct to the next until the end of the run is reached or until a corner makes it necessary to unjoint the rods.

Some types of rods are equipped at each end with rollers, which facilitate the rodding if the ducts are clean. If the ducts are choked with mud and sand it is necessary to clean them or to employ a type of rod in which the joint is little or no larger than the rest of the rod. Screw rods are particularly satisfactory in this respect and where choked ducts are encountered it is frequently quicker to employ them and clean the ducts later with a mandrel on the pulling-in rope than to clean the ducts in advance of the rodding.

Many types of cleaning tools are commercially available, usually consisting of some form of cylinder placed on the first rod. The cleaner is pushed into the duct until filled with the debris. It is then withdrawn and emptied and the operation repeated until the duct is clear. This is obviously a slow and laborious process.

No. 10 or No. 12 annealed iron wire is ordinarily used in connection with the rodding. If the ducts are dry or if the cable is to be pulled in within a few weeks after the rodding, it is unnecessary to employ galvanized wire, but if the ducts are wet and the cable work is not to follow within two or three weeks, the wire is liable to

be so weakened by rust as to break when drawing in the pulling-in rope. At the manhole care should be taken, especially if the ducts are wet, to keep the wire in one direction from contact with that from the other, as in that way the wire is less liable to attack by electrolysis.

When the pulling-in is to be started, the cable reel should be set up in line with the duct run and on the side of the manhole toward the pull, as shown in Fig. 1. This type of set-up is particularly important in the case of large cable, as any other arrangement results in reverse curves in the cable and considerably complicates the feeding. Care should be taken to have the axle bar

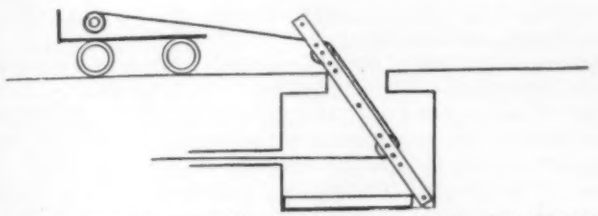


Fig. 3.—Arrangement Permitting Pulling Cable Farther Into Hole on Initial Pull.

level as otherwise the reel will slip toward the lower side as it turns and bind against the support. If the cable is large, two men should be stationed at *a* to handle the reel as the cable is pulled in. One man should sit on the edge of the manhole at *b* to keep the cable from scraping. This man should be in charge of the operations at that point. He should be in a position to signal the man handling the switch and should direct the men at the reel as to the proper speed to pay off the cable. A man should also be stationed at *c* to guide the cable into the duct.

Before the pulling-in can be started, it is necessary to draw the pulling-in rope into the duct, using the wire installed by the rodding gang. This can be done conveniently while the reel is being set up. The pulling-in outfit should be stationed at the proper manhole, in position for the pull, and the pulling-in rope, previously coiled on the drum, should be attached to the end of the wire in the duct. The pulling-in rope may then be drawn in by one or two men if the ducts are clean. The wire should not be coiled in the distant manhole but should be pulled out over the ground as this is much quicker and allows the wire to be coiled later without delaying other operations. If the ducts are to be rodded when the pulling-in is done, the wire is, of course, unnecessary as the pulling-in rope can be attached directly to the rods and drawn in. The rodding, however, ordinarily consumes so much time that the saving in wire is more than offset by the delay to the pulling-in gang. It is usually economical to rod in advance, even for one length of cable.

If the ducts are thoroughly clean and of fiber or wood, the cable may be attached directly to the pulling-in rope, but it is generally better, even under these conditions, to place a mandrel between the rope and the cable. In the case of tile ducts or ducts of any material which are not thoroughly clean, a mandrel is essential to clear the duct and prevent injury to the cable from pieces of duct or foreign matter. When the ducts are badly choked with sand or mud, the mandrel should be pulled through without the cable as many times as required to properly clear the duct. The rodding wire should be attached behind the mandrel in order to again draw in the pulling-in rope.

Various set-ups are used for pulling-in work. The arrangement shown in Fig. 2 is frequently employed but requires two pulley frames, though the frame at the manhole rim may be omitted if the pulling-in truck is equipped with a roller on the end and the conditions permit positioning the truck so as to bring the roller over the hole. The arrangement shown in Fig. 3 is also common, but this and the Fig. 2 set-up require that the lower end of the pulley frame be blocked in position. This requirement is obviated by the set-up shown in Fig. 4, which also gives a more generous angle on the pulling-in rope at the lower pulley. The Fig. 3 arrangement, however, permits drawing the cable further into the hole on the initial pull and if the length in the manhole is sufficient for splicing purposes, thereby eliminating the need of a second pull, that set-up is to be preferred to either of the other two.

Ordinarily no set-up brings sufficient cable into the manhole on the initial pull to permit of properly racking the cable around the hole with the splice at the center of the side wall. This does not refer, however, to cases where some form of hook or loop, known as a pulling-in iron, is set in the end of the manhole just below the duct entrance. By attaching a snatch block to the pulling-in iron, the cable can, of course, be drawn practically across the manhole, but such an arrangement is not satisfactory for large cables as the end wall will not ordinarily stand the strain imposed. It is therefore necessary with cables of considerable size to make a second pull. This can be done by moving the cable grip back a few feet and taking a short pull. This method is quite satisfactory where an "open-end" woven-wire grip is used, but where a grip is employed which involves beating down the cable sheath, it is necessary to adopt other means, such as making a temporary hitch with a rope winding. Where several lengths are to be pulled in, a convenient method consists in making the second pull through the duct in the adjacent section before that section of cable is pulled in. The pulling-in rope and the grip will, of course, be in position for the purpose and it is a short

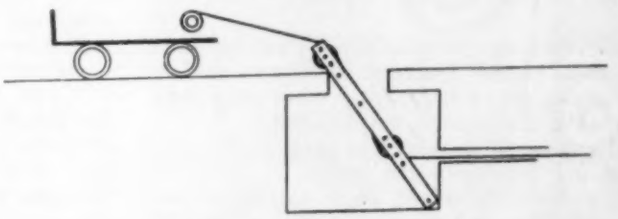


Fig. 4.—Approved Arrangement.

Fig. 5.—Pulley Frame.

matter to pull the cable across the manhole, remove the grip and place it on the second cable ready to pull in that section.

Pulley frames are made in various forms and a common arrangement is shown in Fig. 5. This frame consists of two 6 or 8-inch channel irons bolted together at two or three points with spacing collars of sufficient size to permit the free operation of the pulley. The pulley bearing consists simply of a bolt of the proper diameter with nut to fit, and several holes should be provided in the frame to permit placing the pulley at the proper point in each set-up.

Woven-wire grips, of which there are several kinds

on the market, are satisfactory for ordinary work. Such grips, however, hold only on the sheath and where the situation involves long duct sections and heavy cable and particularly where the ducts are not clean, it is well to use a grip which takes hold on the cable core as well as the sheath, otherwise the sheath may be pulled off the end. Such a grip can be made by beating two or three circular grooves into the sheath, the first 6 inches from the end and the second 10 inches from the first, etc., and braiding on No. 10 or No. 12 iron wire, forcing the wire into the grooves by circular wrappings. The wire should be braided, i. e., laid on in criss-cross fashion and each strand should be carried through a ring or eye 6 inches from the end of the cable, into which the pulling-in rope may be fastened.

Mandrels are usually of hard wood with metal caps at the end. They should be provided with a bolt passing completely through the mandrel and with an eye at each end. The eye should be welded, as the strain may be easily greater than a bent eye could withstand. The shape and size of the mandrel will be governed by the duct, but in general, the outside diameter of the mandrel should be about one-fourth less than the inside diameter of the duct.

Ordinary three-fourths or one-inch manila rope may be used for pulling-in small cables, but for heavy work three-eighths or one-half-inch steel hoisting rope should be employed.

When the cable has been pulled in, it should be tied up to keep the end off the ground, unless it is to be spliced within a day or two. The various lengths should also be connected together electrically and to any other cables which may be present, in order to reduce the possibility of electrolytic corrosion.

First Aid Instructions for Telephone Men

Representatives of the Relief and Safety Department of the Chicago Telephone Company have been holding meetings with the employes of the various local exchanges on the subject of first aid and treatment of injuries. This is the latest feature of the company's welfare work to insure the health of its employes, thus maintaining the high degree of physical and mental efficiency, which is essential to furnishing good telephone service.

Simple but efficient methods of treating cuts, punctured wounds, burns, fractures, etc., are demonstrated, and the danger of neglecting what may seem to be a trifling skin abrasion is emphasized.

A first aid cabinet is provided in each of the local exchanges and the employes are urged to make use of its contents in case of accident, no matter how small the injury may be. For treating a simple cut, tincture of iodine is provided in a handy little vial. Similar treatment is used on all cuts, bruises, scratches and punctures, after which the wound should be covered with gauze, which may be held in place in any manner convenient.

If in larger, deeper cuts the blood is bright red and flows in spurts, this is an indication that an artery has been severed. In order to prevent the loss of a large amount of blood and possibly save the life of the injured person, the injured part should be tightly bound above the wound, that is between the wound and the source of blood supply—the heart—which will stop the blood. In illustrating this part of the first aid treatment, the doctor uses as a bandage (which, of course, does not touch the wound) a pair of suspenders, a belt, an ordinary bandage, or a red flag, such as is used at open manholes, trenches, etc., as a warning signal.

All burns, except acid burns, require the same treatment. Burns caused by acids should first be washed with water, in order to dilute and remove the acid. The only difference between electric burns and other burns is that electric burns usually cover a smaller area and are deeper.

All burns (acid burns after being washed with water) should be immediately thoroughly covered with any kind of heavy oil, such as automobile oil, linseed oil, carron oil or lard oil. In the first aid cabinet furnished by the company there is provided a tube of ointment, which is by far the best thing to put on burns. It is never safe to use axle grease in this manner because of the impurities which are likely to be found in it. Kerosene and gasoline should not be used, because they evaporate too readily to be of any value in protecting the injury from the air.

Bruises and sprains should immediately be bathed in cold water, the colder the better. If cold water is not available very hot water should be used—as hot as it can possibly be borne. Lukewarm water is of no value.

Fractures, that is to say broken bones, should be bound in splints as quickly as possible. Any piece of wood, such as a barrel stave, lath, fence picket, etc., makes a good emergency splint. It is important, however, that the splint be long enough to go well above and below the point where the break is.

In cases where foreign particles have entered the eye, only the simplest methods should be used to remove them. The only safe way for the ordinary person to do is to draw the upper lid down over the lower one and then let it work back. If this does not remove the particle, it will help to start the tears, which may wash it away. A sharp pencil, especially an indelible one, should never be used in attempting to remove particles from the eye. If the method suggested does not relieve, a pad of some soft material held in place by a bandage should be placed over the eye, and the injured sent to a doctor.

All of the simple operations described in the foregoing are demonstrated on a volunteer patient taken from among those in the audience. He is wrapped and bandaged and resuscitated and relieved from all sorts of imaginary pains.

The lecture, which is wholly informal, is given by Dr. B. H. Moore under the supervision of Safety Inspector Fred Rosseland.

"We are told," said Mr. Rosseland, "that the Chinese employ their doctors under contract to keep them well. The Christian nations are beginning to see the advantages of this method, and are today using it more and more in connection with the operation of large industrial organizations.

Indiana Independents Meet

One hundred directors, stockholders and managers of Indiana Independent telephone companies met at Washington, Ind., August 22, in their annual meeting. The business session was held at 10:30 o'clock in the People's Hall, S. M. Isom of Mitchell presiding. Addresses were made by Max F. Hosea of the traffic department of the Indianapolis Telephone Company, Prof. R. V. Achatz, instructor in telephone engineering at Purdue University, and others.

Transmission

Read at the Convention of the Southern States Independent Telephone Association

BY MINOR CORMAN

THE transmission of intelligence by wire, especially telephone transmission, can be looked on as having made long and rapid strides as not many years ago it was not a common occurrence to converse with a friend or transact business hundreds of miles away by the use of a common instrument called a telephone.

Back in the nineties the first telephone line was built into the little village where I attended school, and in the few moments I could steal to loaf, without arousing suspicion at home, I learned from the goods-box loafers that people were talking to the neighboring towns and villages, and that they could even recognize the voice of people they knew. Several months passed and I was wishing all the time that I might have the opportunity to talk over the telephone and be among the few able to make such a boast. Finally the opportunity came, as I had called at the pay station to deliver a message on my way home from school. Knowing exactly what the conversation was to be about I drew enough from my imagination to deliver the right message and the calling station was only twelve miles away at that. It was, however, a great achievement at that time.

The same raw materials we have today were in existence then but the finished product had not been perfected. Cloth, easel, paint and brush transformed by hand into a beautiful picture is called "art." A worthless piece of paper printed in certain designs and signed by the officials of a government, is called finance. Worthless crude materials made into wire, switchboards and telephone instruments are for the use of transmission; but can it rightly be called such until it achieves its purpose? The half finished picture is worthless to the artist; the unsigned notes are worthless to finance, and in equal sense poor construction, poor instruments and apparatus are worthless to transmission.

Pages have been written and pages may yet be written on transmission efficiency. We read of rebuilding or reproducing wave forms, the use of loading coils, audion repeaters, etc., which as a matter of fact are necessary to the success of the much talked of trans-continental line of the American Telephone & Telegraph Company; but the problems confronting the operators composing this association are not trans-continental lines but the radius of ordinary business, and to such they should adjust their lines and equipment, remembering that the best is none too good and according to my experience the cheapest in the long run.

As Independent telephony is not using loading coils and audions, what are the essentials, speaking in everyday telephone terms and leaving technicalities to the technical engineers, to long distance transmission? First a telephone line must be provided, and from a table of transmission equivalents the proper size and kind of wire may be easily determined. The old adage "that a chain is no stronger than its weakest link" may be well applied at this point, as transmission over the best lines that money and skill can construct may be very poor on account of terminal loss, such as running toll lines through cables, inefficient cord circuits, repeating coils with undue loss, high resistance heat coils, and last but not least, unsoldered connections and bad joints. Second comes a good telephone instrument, and third, the proper electrical energy. As a rule engineers and inventors do not waste time to bring something into existence that there is no demand for, neither do telephone companies invest their money in toll lines over which there will be no demand for service, but where the demand is, the service is usually found and if your service is not commercial, you will find that the service of your competitor is and still you are wondering why you do not get your share of the business.

There is a telephone company just fifty miles away, with which you wish to connect, and arrangements are made to construct the line. What preliminaries are necessary, and have you looked the territory over? In the majority of cases, no. We simply construct a line for the fifty miles and do not take into consideration the radius beyond that which could be served and which would make the main line a better revenue producer. Next, has the terminal loss been considered? The aerial wire should be terminated as near the exchange as possible and if it is necessary to use cable on account of a city ordinance or other rulings, a special toll cable should be used as the ordinary cable is meant for local work and the transmission radius is very much limited. You might also be surprised to find that there are several miles of loss right in your central office which could be reduced to a minimum at a comparatively small cost. Soldered joints in line wire are all right provided they are soldered. As most employes are inclined to slight the soldering of joints, I am thoroughly convinced that the sleeve joint is much the best, and taking into consideration the labor saved, they are just as cheap. Ignorance of the law excuses no man from justice and you can safely bet your last penny that ignorance will not excuse you and make your telephone property a revenue producer, if you have through ignorance built it on the wrong principles. There is lots of good information free, for the asking, which the manufacturers and large operating companies will be glad to furnish. Don't be too timid to ask questions and then don't be too timid to analyze the problems that have been worked out for you.

Venezuelans to Buy New Telephone Equipmen

Consul G. K. Donald, Maracaibo, Venezuela, says the local telephone company, a privately owned corporation operating under the name Teléfonos de Maracaibo, has a single equipment, of a capacity of 400 subscribers, but only 300 telephones are now in use. On account of increasing business the company will soon purchase another switchboard. The equipment now in use was made in the United States. The lines are single with a ground return. A battery system is used, but calling is done by magneto.

The rate for both business and private telephones is 16 bolivars ($3.09) per month, unlimited. No telephone directory is issued; calling is by name, not by number. Private "inter-phones" are used to some extent by commercial houses and plantations. These are for sale by local firms.

Ground Connections for Telephone Exchanges

Reproduced by Courtesy of "The Electrician"

BY W. H. GRINSTED

THE systems of ground connections in a well-designed modern central battery exchange are two in number, namely, that used for protection against high tension currents and that in connection with the central battery. The two systems should preferably be distinct, so that in the event of a failure of the ground connection, risk of high tension being connected to the telephone plant is minimized. Further, since the first or protective system must be in connection with the building structure, there is a possibility of fairly large currents flowing in cable racks and in parts of the building framework, if the systems are interconnected. However, the two systems are often combined without giving rise to serious difficulties, so these objections are possibly of little practical importance.

Protective System.—This system is used for the protection of the telephone circuits and apparatus against excessive pressures, and currents due to lightning or contacts with power wires, etc., and also to protect the staff against shocks in the event of a breakdown of the insulation of the motors or their controlling gear. The apparatus grounded by this system usually comprises the main frame, the frames, couplings and shafts of the charging machines and ringing machines, the frames and cases of the controlling switches and starters, the framework of the power board, the lead-covering of the power cables and the conduits for the latter. The main frame carries the "protectors," which include arresters, heat coils and fuses protecting the exchange apparatus from high-tension or excessive currents. The operation of the arrester or of the heat coil connects the line to the frame plate of the protector strip, which is grounded partly through the frame itself, but mainly through a copper strip soldered to a bare copper wire which passes up behind each vertical row of protector strips and terminates in a bare copper bar running the length of the frame. This bar is in turn connected to the ground bus bar. The shafts and couplings of the machines are connected to the frame by means of brushes specially fitted and running on the coupling or on the end of the shaft. The frame of the power board and the apparatus mounted on it are usually connected to the ground bus bar by means of bare copper wire of the cross section required by the wiring rules of the undertaking, from which the power supply is drawn.

Since the ground lead from the main frame is in reality a lightning conductor its route to the ground connection should be as direct as possible. It is usual to connect the other points to be grounded by separate cables or wires to a ground bus bar situated on the power board, from which a common ground cable runs to the ground connection. In many cases the main frame cable is also connected via this bus bar. Since this is generally an indirect route for the cable this practice is not good. It is preferable to run a separate lead by as direct a route as possible to the ground connection.

The water-main or hydrant system is best used for the ground connection for the protective system, as the currents are not permanent and are not likely to affect the building fabric. The connection to the water system should be made on the main side of any water meter or apparatus likely to present a high resistance, or to be temporarily disconnected. If this is not possible such apparatus must be permanently bonded across.

Insulated cable should be used for the connections, except for those local to the power board. Bare connections might possibly be in contact with gas-pipes or with parts of the building to which the lightning flash or high-tension cross might strike through, causing damage at some distant point in the building, especially if the ground connection had deteriorated. As far as possible, too, individual cables should be run for connecting each machine frame, etc., to the ground bar, and in any case where one lead serves two pieces of apparatus it should be looped in to one lug at the first connection. If, then, the ground connection at this point is removed, for instance, during replacement or repairs, the second piece of apparatus is not disconnected from ground.

System in Connection with the Central Battery.—The uses of the connection to ground of one pole of the central battery are not generally realized. It is usually looked upon as providing a return circuit for signaling currents. In this connection it is used chiefly for completing signaling circuits on junction lines, and in some almost obsolete systems for calling or clearing on subscribers' lines. It is also largely used to serve as the return for the current supply to subscribers' private branch exchange switchboards of the common battery type. On large exchanges the current supplied over ground circuit power leads for this purpose may amount to as much as 30 to 50 amperes.

There are, however, other important reasons for grounding the battery. They are briefly:

1. To reduce the number of fuses required, and to avoid the need for insulating some of the return conductors. For these reasons the ground is connected to one pole of the battery and not to the center.

2. To prevent cross-talk and other disturbances due to leakage and capacity currents between the circuits connected to the central battery. As far as telephone currents are concerned, the connecting or cord circuits can be reduced to the elements shown in Fig. 1. The central battery, connected at points b_1 and b_2 can be regarded as a short-circuit for speech currents, and is not shown. Suppose the out-of-balance capacity and insulation of circuit *1* can be represented by an equivalent fault at e_1, and those of circuit *2* by an equivalent fault at e_2. Points b_1 and b_2 on the two circuits are common, being connected together at the central battery. Between points a_2 and b_2 there exists half the potential difference created by the transmitter T_2. This will cause a current to flow through the two faults as follows: From a_2 through e_2, earth, e_1, d, b_1, to b_2. The circuit b_1, a_1, R_1, e_1 forms a shunt to the part of the previous circuit b_1, d, e_1, so that the receiver R_1 on circuit *1* receives part of the current from the transmitter T_2, and is disturbed by speaking, ringing or tone signals passing on circuit *2*. If, however, the common points b_1 and b_2 are connected

to earth the current is shunted out of circuit b_1, a, R_1, e_1, by the ground connection between the equivalent fault e_1, and the common points b_1, b_2. This connection amounts practically to a short-circuit, so that the disturbance of circuit 2 is prevented. When the number of circuits between which such inter-action is possible is considered it will be seen that the ground connection plays a very important part in securing a "quiet" exchange system. These considerations show also one reason why the ground connection should be of as low resistance as possible.

3. To insure prompt indication of faults and assist in locating them. If the insulation to ground of any part of the system fails a circuit is completed via the ground connection on the battery, and thus perhaps the fuse serving that part is blown, or relays are operated, drawing attention to the fault at once. Without the ground connection the circuit would only be completed via some other faulty section. In this way most peculiar effects may be caused; the fault only shows up when both faulty sections happen to be taken into use together, so that great difficulty in locating the trouble is caused. To assist in preventing troubles of this sort all the mounting plates, racks, frameworks, etc., in the exchange are specially connected to the grounded pole of the central battery, the chance connection to ground through cable racks, fixing bolts, etc., not being relied upon.

4. To insure a reliable engaged test on the multiple jacks. The wiring and apparatus in circuit with the operator's receiver, and that in circuit with the multiple jacks, each have a certain, not inconsiderable capacity, and a certain leakage or insulation resistance to ground. Other circuits connected to the opposite pole of the battery have also similar capacities and leakage resistances to ground. With an ungrounded battery each side of the system thus takes up a potential relative to the ground determined by the respective capacities and leakage resistances of the apparatus, wiring and lines connected to either pole of the battery. The amount of apparatus, wiring and lines connected up is constantly varying so that the potential of the poles of the battery relative to the earth will be continually changing. Included in the apparatus and wiring on the positive side are the operator's testing circuits, as shown in Fig. 2. The wiring of these circuits will possess a certain capacity to earth, c, the charge in which will depend upon the potential of the positive pole of the battery relative to earth. As this fluctuates, the capacity c will charge and discharge through the operator's receiver, giving rise

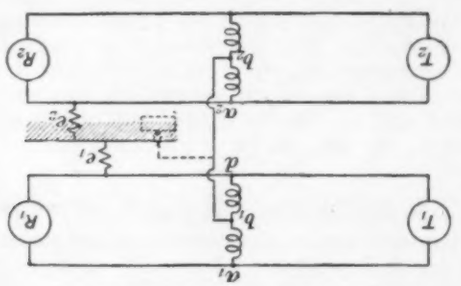


Fig. 1. Circuit Illustrating Cross-Talk.

to clicks which will tend to invalidate the real busy clicks. By connecting the battery to ground all disconnected circuits are caused to take up a definite potential with respect to earth, namely, that of that battery pole to which hey are connected (provided their insulation resistance is reasonably high) so that no fluctuations in the charge on the testing circuit, wiring, etc., can be caused.

5. To assist in identifying wires in outside lines or in distant exchanges. In some cases it is necessary to distinguish between the two wires of one circuit, for example when each side of the line is employed separately for signaling. If, as is usually the case, the wires are connected at the outgoing end to the two poles of a grounded battery, they are readily distinguished by noting their potential against earth by means of a galvanometer or voltmeter.

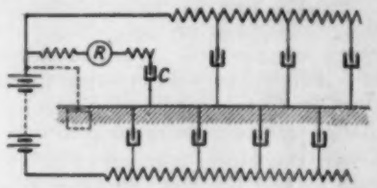


Fig. 2. Circuit Illustrating False Engaged Test.

In telephone exchanges, contrary to the practice on traction systems, the grounded pole is almost always the positive. This insures that the whole of the lines and apparatus which differ in potential from the earth are negative to the latter, so that any leakage currents that exist flow from earth towards the apparatus. Were the opposite the case, the line wires, and particularly the coil windings connected to the free pole of the battery, would be positive to the earth, and so suffer corrosion from leakage currents. This effect is inappreciable with the large conductors and high insulation employed in heavy current engineering. On telephone systems, however, serious trouble can arise from this cause. Even although the insulation were not abnormally low, an extremely small leakage current, flowing, say, from the winding of a relay to its core, and thence to the rack and the negative pole of the battery, would corrode the fine wire sufficiently in the course of a few weeks to cause a disconnection. The instrument wiring and coil windings of subscribers' instruments are particularly liable to trouble of this kind. By grounding the positive pole of the battery instead of the negative, the effect is practically eliminated. In cases where a winding connected to the positive pole is in close proximity to another connected to the negative pole, so that direct leakage can take place apart from any connection with ground, similar trouble can still occur, especially with unfavorable atmospheric conditions.

A second reason for grounding the positive pole is that partial earth faults show up more definitely on test when the conductor is negative to the surroundings. When its potential is positive, the fault is liable to seal up owing to oxidation of the conductor.

It is the usual practice to employ a ground plate for grounding the battery. The value of this ground connection, as it is usually installed, is open to considerable doubt. It generally happens, owing to the use of uninsulated ground bars on frames and racks, that the frame of the building, the main frame ground and the battery ground are all interconnected. Added to this, the sheathings of the cables entering the exchange are often bonded together, and connected to the water main. The current has, therefore, the choice of several paths, of which the ground plate is often not the most favorable. Its resistance to ground is often higher than that of the building frame work, or that of the water system. An E. M. F. up to about half a volt can usually be observed between the copper ground plate surrounded by carbon

and the iron water pipe or building framework, before they are connected up to the battery, the ground plate being positive. This E. M. F. therefore tends to decrease the current flowing via the ground plate. Further, it seems reasonable that the ground plate itself, being connected to the positive pole of the battery, is subject to corrosion in the same way as wiring and coil windings when the negative pole is grounded. If so, one wonders whether anything remains of it a few years after its insulation. It would be very interesting to hear of any examination that has been made of a plate some years after the exchange has been brought into use.

On the whole, therefore, it is very doubtful whether the ground plate acts in the way in which it is supposed to act. The following proposals would secure a more definite return path for the current, and a more efficient and less expensive system of ground connections. It will be noticed that of the various purposes served by

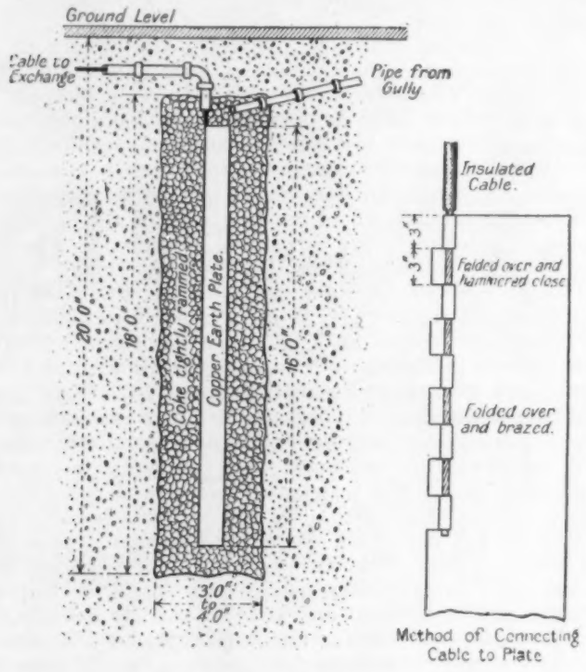


Fig. 3. Coke-well Ground.

the ground on the central battery, only one involves any appreciable currents—namely, its use as a return for private branch exchange power currents. It is desirable, in order to avoid damage to water pipes, etc., that a metallic return conductor should be provided for these currents. Such a conductor is available in modern systems with complete underground distribution, in the shape of the lead sheathing of the cables. The common return conductor for the power leads at the private branch exchange would be connected to the sheathing of the cables entering the building, and at the exchange the sheathing of the cables would be bonded together and connected to the positive pole of the battery. To provide for the few subscribers' switchboards, for which the return could not be provided in this way, the water main would also be connected in parallel at the exchange. The proposed arrangement has the further advantage that the current through the cable sheath would tend to keep the latter at a potential negative to earth, and so reduce he risk of electrolytic corrosion.

The protective or main frame ground system would be entirely separate, and would be grounded by means of a plate or preferably by means of a group of iron pipes in the well-known way.

Considerable difficulty is often experienced in securing a sufficiently low resistance with a ground of the plate type. The method shown in Fig. 3 has been used with success, and in dry high-resistance soils it gives very much lower resistances than the usual method of laying the plate flat, surrounded above and below with beds of coke. The excavation is made in the shape of a well, 3 feet to 4 feet in diameter, and is filled in with coke, well rammed around a narrow plate, 16 feet long by 1 foot wide, of 16 S. W. G. copper sheet, placed vertically in the center. Instead of this copper plate a 9-inch cast-iron pipe might be used. An earthenware pipe is provided for the cable, and a second pipe, reaching to the upper surface of the coke only, is taken to a water gully, if possible one which will be in constant use, so that the soil in the neighborhood of the plate is kept moist. In one case where a direct comparison with the usual method was possible the improvement effected by this method was most marked. The exchange was situated on the top of a hill which consisted almost entirely of sand, the ground water level being at least 60 feet below the surface. The excavation was carried to a depth of 21 feet 6 inches without any signs of sufficient moisture being found, but the ground plate, 8 feet by 2 feet, was installed in the usual way, horizontally between two layers of coke. The resistance measured between the plate and the water-main system was 55.9 ohms. On installing the same plate vertically, in the center of a column of coke 3 feet to 4 feet square and extending a foot above and below the plate, the resistance fell to 13.3 ohms. Even this figure, of course, is far too high to be satisfactory. The resistances usually attained vary from 0.01 ohm to 1.6-ohm., when the plate can be installed below ground-water level, and from about 2 ohms up to as much as 15 ohms when ground-water level cannot be reached. Resistances above 2 ohms cannot be looked on as satisfactory.

Four Days for Convention This Year

In connection with the coming convention of the United States Independent Telephone Association, it has been decided to hold a four-day convention. The dates will be December 5, 6, 7 and 8.

The Association decided upon a four-day meeting in order that the exhibitors, who patronize the convention so generously, might be given a better opportunity than they have had in the past years.

Therefore this year the morning of each day will be given over to the exhibitors and during the afternoon the exhibit rooms will be expected to be vacated and locked and everybody attend the program. This will work to the advantage of all concerned.

California Operating Rules Standardized

A standardization of the rules and regulations of the smaller Independent telephones of California is being effected as the result of the adoption by the Pacific Telephone and Telegraph Company of an entire new series of service rules. The Independent companies' new rulings are based on the rulings of the Pacific company. A number of the companies of the state are submitting their rulings to the public service commission for official approval.

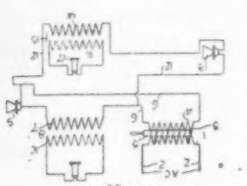
Telephone Patents Issued Recently

A Brief Digest of those Current Specifications Most Interesting to Telephone Men

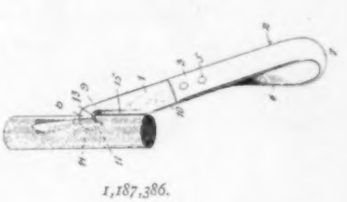
BY DAVID S. HULFISH

NOS. 1,184,932, 1,184,933 and 1,184,934. Automatic Systems. Issued to A. H. Dyson, assignor to Kellogg Switchboard & Supply Company, Chicago, Ill. Three early patents upon details of the Kellogg automatic system. Applications filed October 31, 1915, December 20, 1905, and April 27, 1906.

No. 1,184,932 shows the Kellogg spherical-bank switch with an automatic system of circuits. Details covered by the claims are: A repeater individual to the first selector and



1,188,002.



1,187,386.

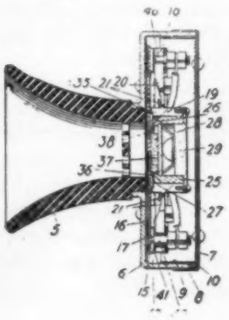
repeating the line currents for all selectors used in a connection. A ringing circuit disconnected by the response of the called line. A relay holding the wiper conductors open during selection.

No. 1,184,933 shows the Strowger type of switch and a manual cord pair in a combined or semi-automatic system. The claims cover a line having jacks and having multiple tags in connectors, all the points of the line being made to test busy when the line is taken at any point. Also a connecting path between two lines, the path being closed in one part by a manual cord pair and in another part by an automatic switch.

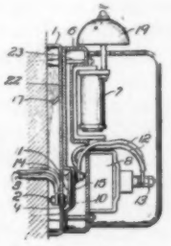
No. 1,184,934 covers a combined manual and automatic system in which only a part of the lines have automatic substation equipment and a part of the lines have only manual substation equipment, with switching means accessible by any line to gain access to any other line.

No. 1,186,563. Automatic Telephone Exchange. Issued to E. D. Fales, assignor to First Trust and Savings Bank, trustee, Chicago, Ill. (Application filed September 26, 1906.) A patent upon the Stone system of battery feed as applied to an automatic connector switch, two condensers and four relays being used.

1,186,817. Semi-Automatic System. Issued to E. A. Mellinger, assignor to Automatic Electric Company, Chicago, Ill. In sending automatic controlling signals from a keyboard call



1,188,053.



1,189,001

sender, the forward movemest of the dial causes the dial circuit to pick up an idle trunk, and the return movement of the dial sends the first set of impulses over the trunk to select the first digit.

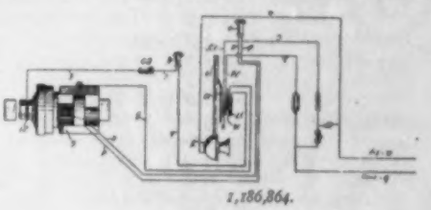
1,186,823. Measured-Service System. Issued to F. Newforth, Jr., assignor to Automatic Electric Company, Chicago, Ill. In an automatic telephone exchange, the meter of the calling line is operated by a current transmitted from the final connector over the release circuit, an additional battery to give strengthened being used.

1,186,864. Switchhook for Repeater. Issued to E. E. Trafton, Portland, Maine. A repeater, or speech reinforcing device, is included in the local circuit of the receiver at the telephone set; a double hookswitch closes the receiver circuit and also the circuit of the speech relay.

1,186,901. Ground Clamp. Issued to W. H. Higgins, Philadelphia, Pa. A stove bolt is combined with a strip of metal bent as shown; the metal strip is bent to hook form at the end to attach the wire.

1,186,908. Automatic Switch. Issued to C. A. W. Hultman, Stockholm, Sweden. A rotating shaft carrier striker

1,186,901.



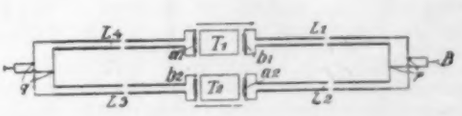
1,186,864.

arms, one set of arms engaging springs as they move, the other set of arms operating springs by a sliding of the shaft after stopping.

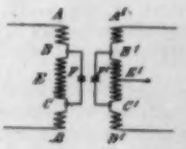
1,187,095. Selector Circuit. Issued to F. N. Reeves, assignor to Western Electric Company, New York, N. Y. A power driven automatic switch has its controlling magnet operated in part by a test relay and in part by a commutator or interrupter device on the switch, the latter device acting to prevent the brushes from stopping between tags.

1,187,386. Cable Stripper. Issued to A. A. Pehrson, New York, N. Y. A cutting hook has a depth gauge, so that it may be used for stripping insulation from cables without cutting too deep.

1,187,634. Automatic Exchange. Issued to J. H. and G. W. Lorimer, assignor to Western Electric Company, Inc., New York, N. Y. (Application filed April 24, 1900.) This is the original Lorimer application. Concerning this system of switching, much has been written in books, but this patent is the first official description offered by the owners of the system. The system is one of automatic switch brushes driven by a constantly running motor shaft; the patent covers broadly the selection of a calling line by a set of switching apparatus, and the combination of common battery speaking with an automatic switching system; it covers also central-energy ringing by a telephone push key. The patent as issued



1,189,411.



1,189,728.

has twenty-four sheets of drawings, forty-two papers of description, and four hundred twenty-five claims.

1,187,671. Automatic System. Issued to A. E. Stevens, assignor to S. H. Couch Company, Atlantic, Mass. An automatic branch exchange for automatic telephone system. The calls from the main office are controlled by an operator at the branch station, but are completed by automatic switching apparatus.

1,187,806. Automatic Relay System. Issued to G. A. Betulander, N. G. Palmgren and O. Grahn, assignors to Relay Automatic Telephone Company, Ltd., London, England. A call sender at the telephone causes variations in the line current; these variations adjust impulse relays and impulse trans-

mitters, which in turn adjust selecting relays to select and connect with the line desired.

1,187,928. Test Circuits for Searching Switch. Issued to F. N. Reeves, assignor to Western Electric Company, Inc., New York, N. Y. In a searching automatic switch having a motor magnet requiring continuous current, the current is supplied in part through a testing relay and in part through an interrupter in the switch itself, so that the energization of the magnet is continuous, until a suitable line is found for stopping the switch.

1,187,947. Call Distributing System. Issued to A. H. Weiss, assignor to Kellogg Switchboard and Supply Company, Chicago, Ill. A searching switch picks out an idle cord pair for the connection when a line calls; by control of the operator, the switch may be caused to search over different groups of cord pairs, as the occasion of the traffic requires.

1,188,002. Transmission System. Issued to H. J. Meredith, Holyoke, Mass. The current supply to the transmitters is alternating current of low potential, supplied through a transformer to the speaking circuits.

1,188,053. Transmitter and Compensator. Issued to H. C. Egerton, assignor to Western Electric Company, Inc., New York, N. Y. The back of the carbon cell is supported by a thermal element shaped to relieve the carbon cell when heated, to prevent packing by excessive current.

1,188,804. Automatic Exchange. Issued to T. G. Martin, assignor to First Trust and Savings Bank, trustee, Chicago, Ill. (Application filed December 16, 1905.) Because of the early date of application this case would carry broad claims, but the claims are limited to specific means and apparatus combinations. The Strowger three-wire system is shown, with automatic ringing relay, and common battery feed of speaking current to telephone lines.

1,188,929. Automatic Trunking System. Issued to C. L. Goodrum, assignor to Western Electric Company, Inc., New York, N. Y. Upon lifting the telephone receiver of an automatic line, the line is connected over two circuits to two selectors, one in the home office and one in a distant central office. Upon the dialling of the first digit a determination will be made automatically as to which of the circuits shall be used for the connection, and the other circuit and selector is released.

1,189,001. Portable Telephone. Issued to D. G. Saunders, Jr., Kansas City, Mo. Wall boards are provided at convenient points having projecting terminals. A portable box telephone set is hung upon hooks over the wall board and contact plates engage the projecting terminals by the weight of the telephone box, thus completing all circuits needed.

1,189,364. Automatic Switch Control. Issued to A. E. Keith, assignor to Automatic Electric Company, Chicago, Ill. By placing an earth upon a guide wire, an automatic switch is caused to begin moving and to continue to move until the guide wire earth is encountered.

1,189,411. Repeater System. Issued to A. S. J. Van-Kesteren, Vlissingen, Netherlands. A four-wire line has a voice repeater, using a line for conversation in each direction between the terminal stations, the lines being connected together at the ends, the damping of the lines being greater than the strengthening of the voice currents by the repeater, thereby preventing "singing."

1,189,458. Release System. Issued to A. E. Lundell, assignor to Western Electric Company, Inc., New York, N. Y. In an automatic exchange, each connector is released by a slow relay, and the answering of the called line causes the slow relays to be switched into circuit.

1,189,525. Meter System. Issued to Garrison Babcock, assignor to Telechronometer Company, Rochester, N. Y. (Application filed July 5, 1910.) Each telephone is provided with a message meter counting the number of messages sent, and a time meter computing the total time that the telephone is used both on sent and received messages. An auxiliary device under control of the subscriber may be operated to disable the message meter and to disable the transmitter upon an effort to send a message, but leave it operative for received messages.

1,189,728. Repeater Circuit. Issued to A. H. Olsson and H. B. M. Pleijel, Stockholm, Sweden. A telephone repeater for speech currents and for ringing currents, having two induction coils, one for speech currents and one for ringing currents, the windings of the two coils being connected in series, and a pair of condensers of small capacity being bridged around the windings of the ringing current repeater to facilitate speech transmission.

1,189,836. Semi-Automatic System. Issued to Edmund Land, assignor to Kellogg Switchboard and Supply Company, Chicago, Ill. (Application filed January 30, 1905.) By lifting the receiver, a calling telephone causes the operation of automatic switches to connect his line with a manual operator. There are 81 claims.

1,189,862. Ringing-Current Distributor. Issued to H. F. Obergfell, assignor to Automatic Electric Company, Chicago, Ill. Where several groups of lines are being rung intermittently, all of the groups are not rung at the same time.

1,190,548. Hookswitch. Issued to W. W. Henry, assignor to S. H. Couch Company, Atlantic, Mass. In a flush-type wall set, a tubular extension is put upon the receiver, and lifting the extension tube operates the switch.

1,190,185. Common Battery Automatic System. Issued to T. G. Martin, assignor to Automatic Electric Company, Chicago, Ill. The line relay is permanently across the wires, and when a connection is established certain retardation coils are added to the speaking circuit.

"Exchange Limits" in Wisconsin

The building of a short piece of additional telephone line by farmers' companies is called for by the interpretation made by the Wisconsin Telephone Company of contracts existing between that company and the farmers. The farmers' companies affected are the Sugar Bush Mutual, the East Maple Creek and the Lebanon lines. Until the January sleet storm connections between those lines and the New London exchange were made at the city limits. Recently the Wisconsin Telephone Company gave notice that connections would be made hereafter at a point on the exchange limit, which is inside the city limits.

Officials of the farmers' lines say they have paid for exchange service till April 1 and declined to comply with the new regulation. Rather than have the service interrupted pending settlement of the controversy the Wisconsin Telephone Company strung wire on fence posts and restored the connections broken by the sleet storm.

The farmers talk of making an appeal to the state commission.

Utah Court Upholds Subscriber Contract

A decision of far-reaching importance is that of the Utah Supreme Court, which has just upheld that part of the usual contract between the telephone company and the subscriber which says: "The subscriber agrees that the instrument shall be used only for the purpose of personal communication of the subscriber and his employes or immediate household, upon the subscriber's business."

In the case of Johnson vs. The Mountain States Telephone & Telegraph Co., Johnson, proprietor of the Metropole Bar of Salt Lake City, sought a mandamus to reinstall his telephone, removed by the company because he permitted the instrument to be used generally by his customers when a public pay station was in operation for the convenience of his customers.

The case was decided in favor of the company.

Fighting Pole Tax in Iowa

In the Supreme Court the Iowa Telephone Company states it is fighting the $40,000 annual pole and wire tax in Des Moines because if it stands Davenport, Burlington, Keokuk, Ottumwa, Council Bluffs, Dubuque and twenty other cities also will demand such a levy.

The company says if it must pay hundreds of thousands of dollars for use of the streets, it will be required to raise rates for service and the tax would be passed on to the public. The Polk county district court held the city could collect the tax. The telephone company appealed.

Measuring Feeble High Frequency Currents

Translated from L'Industrie Electrique

BY BELA GATI

THE accurate measurement of high-frequency alternating currents is by no means a simple problem. At low frequencies, shunted ammeters can be used satisfactorily; but when dealing with frequencies such as are met with in telephonic or wireless telegraphy work, some other apparatus must be used, to secure at once accuracy and variable range of measurement. The barrette method offers many advantages. Referring to Fig. 1, the principle employed is that two fine platinum wires, *B, B1,* are arranged in a balanced bridge circuit, round which a weak constant current is circulated by accumulators, *A A.* The high-frequency current to be measured is applied to one of the barretter coils, *B1* (inductances *D D* preventing flow of high-frequency current through the remainder of the d.c. circuit) and the resultant heating of *B1* disturbs the balance of the bridge and yields a deflection on *G* which is a measure of the strength of the high-frequency current examined.

The author finds that barretter wires 0.0005 mm. in diameter can be employed without difficulty, but they are too fragile for transport—particularly by post. For telephonic measurements, 0.003 mm. wires are suitable; gold is slightly more sensitive than platinum, but the latter metal possesses the important advantage of being less susceptible to damage by shock. Such telephonic barretters can be sent safely htrough the post and will even withstand the energetic investigations of customs officers.

The barretter wires are mounted in metallic capsules from which the air is *not* exhausted; owing to the simplicity of its construction, a burnt-out barretter can be repaired very economically. The repair of an equivalent hot wire instrument is a much more costly matter.

In its practical form, a barretter equipment comprises barretter capsules, inductances and regulating rheostats, *R R1,* mounted together with the necessary connecting terminals in a wooden case. The necessary connecting leads are provided with the equipment and are distinctively colored; the use of other leads may affect the calibration of the apparatus. When adjusting the latter prior to use, the galvanometer is not connected till the accumulator circuit has been closed. The shunt resistance across the galvanometer is gradually increased, the bridge circuit being meanwhile balanced by aid of the coarse and fine rheostat cursors, *R R1.* Fnially, the galvanometer shunt circuit is opened. At all times, care should be taken that neither the barreter shells nor the rheostat contacts be touched by hand; the former would absorb a quantity of heat which would only b eslowly dissipated, and the latter, by becoming greasy, would vary in contact resistance. The bridge circuit being balanced, the high-frequency circuit is closed on *C C* through a condenser preventing flow of direct current through this branch. A galvanometer having 50 scale divisions (each corresponding to 1 micro-ampere direct current) yields, when used with a 2 micron barretter, 10 degrees deflection for 300 microamperes, 50 degrees for 560 microamperes, 30 degrees for 700 microamperes and 50 degrees for 850 microamperes high-frequency current. Byusing a three-micron barretter with 1-1, 1-2, 1-10 and 1-100 galvanometer shunts, it is possible to measure from 0.1 milliamperes to 20 milliamperes high-frequency current. The maximum direct current in the bridge is 15 milliamperes to which the barretter offers about 95 ohms resistance. Using 1-1, 1-2, and 1-10 shunts; 20, 50 and 100 micron barretters permit measurement of currents up to 150, 700 and 1,000 milliamperes respectively. Small tungsten filament lamps can be used as barretters in measuring currents exceeding 1 ampere. Their resistance is low compared with that of hot wire instruments in common use today, hence they are very suitable for "wireless" measurements.

Fig. 2 shows the connections of an apparatus employing several barretters. When using the tungsten barretters, only the latter must be connected in each half of the bridge. It is not difficult to manufacture tungsten and other resistances with such accuracy that the microammeter shows no deflection, in a bridge initially balanced, when the position of the barretter selector switch is changed. Barretters not in use should be short circuited (see Fig. 2) unless very high frequencies have to be measured, in which case (since there is a danger of current being induced by higher harmonics, in short-circuited barretters) the solution indicated by Fig. 3 may be employed.

Coils 1, 2, 3, etc., are of small inductance sufficient to obstruct the flow of very high frequency current (such as used in wireless work.) Connections are made to the barretters by jacks I, II, etc. Where this arrangement is used, barretters may be at some distance from each other, *e. g.,* the tungsten barretter may be close to the earth, 10 or 20 yards from the compensating bridge, the 3 micron barretter being used in the receiving circuit.

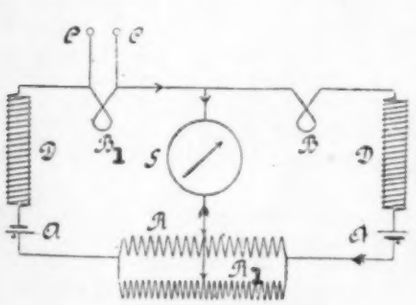


Fig. 1.

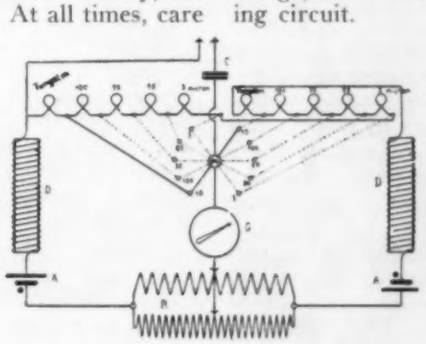


Fig. 2.

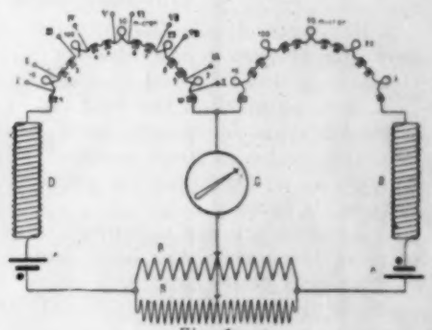


Fig. 3.

Bell Promises Hinge on Merger

Although the proposed telephone merger ordinance and the ordinance containing the franchise for the Southwestern Telephone Company had not been submitted to the city council of Austin, Texas, at the time, J. E. Farnsworth of Dallas, general manager of the Southwestern Telephone Company, stated that his company is prepared to start work on the new telephone building not less than six months after the merger ordinance had been passed and accepted by his company. Mr. Farnsworth declared that in the matter of a franchise those granted by the cities of Houston and Waco apparently contained every kind of a clause advantageous to the cities, and advised that they be used as models for the proposed franchise to be granted the company by Austin.

Mr. Farnsworth stated that his company, if the merger is granted, would expend approximately $350,000 on the new building and equipment.

Capt. W. B. Walker, who is opposed to the merger unless the company would make a reduction of rates, was also present at the hearing in the expectation that the proposition would be introduced by Mayor Wooldridge.

More Indiana Absorptions

A deal has been closed, subject to the approval of the public service commission, whereby the whole of the telephone service in Hendricks county owned by the Consolidated Telephone Company will be transferred to the Indianapolis Telephone Company. All the local and toll lines of the Consolidated Telephone Company, including nearly 1,700 telephones and the exchanges at Danville, Plainfield, Brownsburg, Pittsboro, North Salem and Fayette, will be absorbed by the Indianapolis company. It is understood the deal involves approximately $80,000.

A petition was filed with the public service commission asking for the approval of the transfer. Should the commission act favorably on the petition the stock will be immediately turned over to the local company which will take possession of the consolidated telephone property at once.

E. L. Cline, general manager of the Indianapolis Telephone Company, said the transfer would mean the general improvement of the telephone service in Hendricks county. Much of the equipment will be rebuilt and new switchboards will be placed where they are needed. He said the company was not prepared to say whether the improvements would include automatic service in the towns. The plant at Danville is a large one in comparison with the size of the city.

Bell Revenues

Revenues of the Bell system invariably increase, says the Boston *News Bureau*. The question as between a period of good general business and prostration such as marked the first two years of the Wilson administration is merely how much of a gain there is going to be in total income. This year American Telephone will achieve the greatest gain of any single year in its history.

As the signs are pointing the company by the end of next December will have added nearly $27,000,000 of the new gross and will show for the year gross receipts of better than $265,000,000. This means a growth at the rate of 11.3 per cent against 6 per cent in 1915. It is necessary to go back to 1907 to find a time when the percentage of growth was as large as it is running this year.

The regularity of gain in Bell Telephone earnings makes it possible to foresee the day when the receipts of this property will cross the $300,000,000 mark. By the middle of 1918, or two years from now, gross revenues of the Bell system should be running at the rate of $300,000,000 and for all of 1918 the company will probably show a gross income of considerably more than $300,000,000.

Contrast this $300,000,000 with the $128,000,000 gross which was the aggregate under the first year of the present management and the expansive power and vitality of the telephone industry are given an endorsement which can be approached by very few public service corporations. A 140 per cent expansion in 11 years is a record of consistency which is decidedly unique.

There is just a chance that by the end of 1916 the Bell system will have a total of 10,000,000 stations. The aggregate will fall not more than 100,000 this side of that figure, and if present growth is even slightly accentuated the station total should reach the 10,000,000 mark. Back in 1907 the total was around 3,500,000 stations, only one-third the prospective figures for December 31 next.

Pioneers to Hold Sixth Meeting

The sixth annual meeting of the Telephone Pioneers of America will be held at Atlanta, Ga., on October 19 and 20, 1916, with headquarters at the Georgian Terrace Hotel.

The business meeting will be held in the morning of the 19th, papers will be presented in the afternoon, and in the evening the annual banquet will be given by the American Telephone & Telegraph Company, to which Pioneers and members of their immediate families are invited.

On the 20th the Southern Bell Telephone & Telegraph Company has invited the members and their immediate families to participate in an automobile ride to the Druid Hill Golf Club, where a barbecue will be served about 1 o'clock in the afternoon. Following the barbecue the visitors will be shown, in automobiles, the points of interest in and around Atlanta.

The transportation committee is arranging for reduced fares from central points in the West, which will be announced in the committee's itinerary.

Cuban Telephone Prepares for Connection

The Board of Directors of the Cuban Telephone Company have declared a dividend of 12 per cent on the preferred stock. All accrued dividends to June 30 to the stockholders of September 1 are payable on September 15. It was also decided to consider a dividend on the common stock in September. The board approved a contract with the Spanish Bank and Upmann & Co. for the immediate sale of $2,500,000 worth of bonds.

Direct telephone communication between New York and Hanava soon will be accomplished. The Cuban Telephone Company has arranged to sell its bonds to be used to defray the expenses of laying a cable between Havana and Key West.

Public Utility Commission News

Reports Cancerning the Activities of State Regulating Bodies in the Telephone Field

California

COPIES of an order of the State Railroad Commission were received, granting permission to the Pomona Valley Telephone and Telegraph Union to invest $26,425.88, which it has received from the sale of its bonds, as working capital, pending investment of the same in improvements to its plant.

Informal negotiations with the State Railroad Commission by which the Home Telephone Company of Los Angeles hopes to receive authority to demand compensation from its subscribers for slugs found in its telephone pay boxes are now in progress and a protest is expected to be raised by such subscribers should the Railroad Commission grant the authority sought by the corporation.

In accordance with a resolution passed by the Board of Public Utilities shortly after pay stations were installed in all public places of the city, the telephone companies have been destroying the slugs found in the pay boxes and, after deducting the rental of $5.50, have been refunding to the subscribers two cents out of each nickel in excess of this amount.

Since it was decided to give the Railroad Commission exclusive authority in dealing with telephone rates, this is the first time an attempt has been made to change the regulations governing the company's operations.

Idaho

In a complaint filed Saturday with the commission, the Pocatello Security Trust Company objects to the long distance service furnished in its town by the Mountain States Telephone & Telegraph Company.

Illinois

By an order issued at its last meeting by the Public Utilities Commission the Stephenson County Telephone Company and the Freeport Telephone Exchange Company become merged into one company, the former company taking over the interests of the latter, the consideration being $65,000. In an interview with D. C. L. Mease, president of the Stephenson County Telephone Company relative to the future of the companies he made the following statement:

"In pursuance of a strong sentiment in favor of doing away with two telephones, negotiations have been in progress for the last eighteen months for the consolidation of the two telephone companies.

"About January 1, 1916, the two companies got together on the matter of terms and shortly after it was taken up with the sate public utilities commission at Springfield which now has exclusive jurisdiction of all public utilities in Illinois.

"A copy of their order was received the other day by both the Stephenson County Telephone Company and the Freeport Telephone Exchange Company, authorizing the purchase and consolidation and the issuance of new securities.

"The details of the deal are as follows: The Stephenson County Telephone Exchange Company buys the entire plant and equipment of every kind of the Freeport Telephone Exchange Company. This includes all the property of every kind of the old company, both city telephones, rural telephone. farm lines and long distance lines. The price paid is $65,000. While the price paid is much less than the property is worth, it is acceptable to Mr. Farwell for the reason that he realizes that the public is dissatisfied with two telephone systems, and as he did not feel like buying out the new system, he decided to sell.

"At the present time the rates for business telephones in the city of Freeport are: Freeport company, $2.25; Stephenson County, $2.50, or a total to a business subscriber of $4.75, as practically every business man has to have both phones. Under the new system the Stephenson County will furnish all the service and connections of the two phones upon one telephone instrument, doing away with the nuisance of two telephone instruments, two different numbers, etc., for $3.50 a month, instead of $4.75. A single line residence phone now pays as follows: Freeport Company, $1.75; Stephenson company, $2.00. Under the new system all the service will be given for $2.50 instead of $3.75.

"The users of the four-party line residence telephones, however, are the greatest gainers by the consolidation. The Bell company now charges $1.25 per month for their service and the independent company $1.50 per month for their service. Under the new system the four-party line residence subscribers will receive all the service from both the present lines for $1.50 a month and will have access to all long distance connections anywhere in the United States.

"There will probably be no change in rates, however, for a number of months until the consolidation is effected. Until such time as the work is completed the Stephenson county company asks the public to be patient. The work of consolidation of the two lines in Freeport will be pushed as rapidly as possible."

The decision in the application of the DeKalb County Telephone Company for a raise of its rates has been made and it is favorable to the raise which, in compliance therewith, will be put into effect October 1.

On and after October 1 the rates at the DeKalb exchange will be raised from $21 present individual line residence telephones to $24 per year. From a rate of $15, two-party line residence telephones will be $18.

At the Sycamore exchange, individual line business telephones from $24 will be raised to $30 per year. Two-party line business telephones from $20 to $24 per year; extension bells from $1 to $3 per year.

At the Malta exchange a four-party exchange residents' telephone will be raised from $12 to $15 per year.

In Genoa, Kingston, Kirkland, Esmond, Fairdale, Maple Park, Hinckley, Waterman, Shabbona and Lee exchanges the six-party line residence telephone has been discontinued. The charge for 884 party line residence phones will be $15 after the first of October, and the extension bells will be raised from $1 to $3 per year.

In State Public Utilities Commission vs. Noble Mutual Telephone Company, 268 Ill., it was decided that a telephone company organized on the mutual plan and

not for profit, which operated a telephone exchange under an ordinance making it obligatory upon the company to render service to all the residents of the village, except to members of commercial telephone companies, and which rendered service only to its members at cost, is a public utility within the meaning of the public utilities act.

On the other hand it was decided in State Public Utilities vs. Bethany Mutual Telephone Association, 270, Ill., 183, that a telephone company which is organized under its charter to engage in public service or to devote its property to public use is not a public utility nor within the jurisdiction of the state public utilites commission.

Other decisions of the Supreme court have upheld the right of the commission to exercise power over grade crossing, regulate the crossing of the tracks of one railroad by another, extension of lines, fixing of rates, and holding public hearings.

Indiana

The Indianapolis Telephone Company the last part of July surrendered to the Indiana Public Service Commission the franchise of the Cicero Telephone Company, owned by the Indianapolis company, and accepted, instead, under the public utilities law, an indeterminate permit to conduct its business under the supervision of the commission.

The Public Service Commission has fixed rates for the Connersville Telephone Company as follows: Residence phones, $1.50, $1.25 and $1 a month; business phones, $2.50 and $2 a month, and rural phones, $1.40 a month. A discount for prompt settlement of charges is allowed.

Kansas

No active measures have yet been taken by the City of Leavenworth toward opposing the petition filed by the People's Home Telphone Company with the State Utilities Commission, asking for an increase in local rates. City Attorney C. P. Rutherford was instructed by the city commissioners at the last meeting to take the first legal steps to contest the petition.

Mr. Rutherford says that he is waiting for the utilities commission to notify him of the action of the telephone company. It is customary, he says, for the commission to do this, and he expects to be furnished soon with a complete report of the nature of the telephone company's petition. Until that time it appears that nothing much can be done in the matter.

The plans to be used by the city in fighting the matter will not be definitely known, the city attorney says, until he has received the expected information from the utilities board. In order to make a case it will probably be necessary to audit the books of the telephone company and to make an appraisal of the company's property.

To do this the city will have to hire an expert accountant to go through the books and see that they have not been juggled in order to make the company's business appear worse than it really is. It will also be necessary to obtain the services of an engineer to examine the entire telephone system and make a detailed report of the value to check up the valuation placed on the plant by the company's engineers. This work will require several months to complete, and it will probably be well into the winter before the city has all the necessary information for its case.

The telephone company's petition was filed with the state commission July 6 by A. E. Dempsey, local attorney, following several months spent in preparing information to show the Kansas officials that the rates should be raised.

The new schedule of telephone charges proposed by the company would leave the rate of $4 per month for a single line business telephone the same.

A two-party line business instrument will be raised to $3.50 instead of the present rate of $3.

Single line residence telephones are also fifty cents higher, being $2 per month instead of $1.50.

A two-party residence line will be $1.75 instead of $1.25.

Another request made by the telephone company is to require all new subscribers to pay for three months' service in advance. All other subscribers would have to pay one month ahead.

These rules will apply only to Leavenworth City, proper, and other regulations have been requested to apply to the rural districts served by the local company.

The increases are asked on the ground that the rates charged here are unreasonably low and do not allow the company a chance to make a fair profit.

The city commissioners declare, however, that the rates charged here are high enough and that they are the same as are used in cities all over this part of the country.

Maine

The Maine Public Utilities Commission has authorized the Raymond & Webb's Mills Telephone Company to sell and transfer its lines, apparatus and franchise to the Poland Telephone Company. The two companies are competitors and there seems to be too little business for both utilities. It appars to the commission to be desirable for one of the companies to retire and hence the decision, which will result in enlarged service to the public. The agreed-upon price is $900.

The New England Telephone & Telegraph Company is planning to rebuild its lines between Dexter, Maine, to the Garland town line. Poles will be relocated and wires and fixtures improved.

The New England Telephone and Telegraph Company has obtained permission from the Public Utilities Commission of Maine to issue 6,772 shares of stock, proceeds from the sale of which will be used for miprovements and extensions in that state.

Massachusetts

The Massachusetts Public Service Commission has suspended the proposed withdrawal of second party use of service on unlimited service by the Eew England Telephone & Telegraph Company until October 1, 1916. The proposed withdrawal had already been suspended until August 1.

Michigan

The hearings on the petition of the Michigan State Telephone Co. for $700,000 more in rates every year from Detroit, will be resumed by the state railroad commission, it is announced, on Wednesday, September 6. The telephone company has about finished its case and the city, which is bucking the proposition, will put in its evidence.

The hearings were put off from last June, because of the torrid weather, according to those concerned, but other reasons seemed to govern.

Nebraska

The Tri-State Telephone Company, a proposed merger and consolidation of the leading telephone interests of northwestern Nebraska as far east as Valentine, has failed to accept the terms of the Nebraska railway commission to be allowed to issue $108,000 in stock and $75,000 in bonds.

In the hearing on the proposed issue, the commission made a steep cut in the requests of the new corporation, and laid down vigorous requirements as to the disposition of the funds, with the stipulation that the terms of the commission be accepted within ten days. The ten days have expired and nothing has been heard from the company.

It is now up to the company, if it pursues the plan to make the proposed stock and bond issue, to appeal for an extension of time or make a new showing before the commission.

The Platte Valley Telephone Company of Scott's Bluff has been given authority to issue and sell an additional $25,000 in stock to better the condition of its lines.

The state railway commission in granting the request specifies that the company must make a full report of expenditures in connection with the deal to the commission.

The right of a railroad company to force a telephone or electric light company to raise its wires over crossings of the road when the former had prior right, has been declared against the railway companies by the state railway commission, in a controversy between the Northwestern Railroad Company and the electric light company at Bristow, owned by the city.

It appears that the city council gave the railroad company the right to run a spur through its streets. After the spur was run the railway company complained that the wires of the city electric plant were not strung high enough to meet the law and demanded that they be raised.

The city appealed to the commission, which declares that where the rails of the company were laid after the wire company had strung its wires that the expense of raising the wires must be borne by the railway.

The state railway commission has received complaints that the Lincoln Telephone Company has taken the town of Denton out of its list of towns receiving free service from Lincoln and has by indirection attempted to force subscribers to use its toll line at a charge of 15 cents a message. After an informal inquiry the commission informed the company that it must change its methods and reinsert Denton in the list of towns in the back of its Lincoln directory. The company now carries the town in the Lincoln directory containing a list of Lincoln subscribers, under the "D's," but it is complained that subscribers do not think to look for a town in a list of persons, but would naturally look for it in a list of towns. The company is told to replace Denton in the list of towns, together with its number, but it need not carry with it the list of Denton subscribers, as was done previously.

W. V. Barton of Lincoln brought the matter to the attention of the commission. He said he was unable to get Denton through information, as he had been accustomed to. When he rang the number formerly given in the Denton list he was told by information at Lincoln that there was no such number and that the only way to get Denton was to pay a toll. "Information" said that these orders came from headquarters.

The Crete Telephone Company is also somewhat interested. That company has an exchange at Denton and has a trunk line into the Lincoln switchboard for which it pays a flat rate and in turn charges its subscribers 50 cents a month for unlimited service from Denton to Lincoln. The Lincoln company has also been giving free service from Lincoln to Denton and has not formally applied to the railway commission to discontinue such service. As the Lincoln company does not own the exchange at Denton it is not required to restore the list of Denton subscribers to its Lincoln directory.

The hearing before Railway Commissioner H. G. Taylor to decide whether or no the merger of the Kearney Independent Telephone Company should be effected with the Nebraska Telephone Company and also to establish the right of the local company to raise rates and switching charges in certain farm districts was held at Kearney, August 12.

Assisting Commissioner Taylor, who was the only one of the board present, with his reporter, Miss Hedges, and engineers, R. F. Forbes and H. A. Couch, of Lincoln.

It was not the intention of the commissioner to give out an opinion at this time and only the hearing and taking of records consumed the time allotted.

The protest which was presented to the commission dictates that the farmers of the Union Valley Telephone Company object to a raise of the switching charges from 25 to 50 cents a month. They are content to permit the same charges to stand but think that an increase is not necessary because of the service given.

Ohio

Another expert examination of the plant of the Lima Telephone & Telegraph Company has been authorized by the Ohio Public Utilities Commission, and a crew of six inspectors has arrived from Columbus to undertake the work. They are headed by H. T. Jenks and have rented a suite of office rooms in the new Parmenter building on North Elizabeth street at Lima.

The appeal of the company for another appraisal by the engineers was granted finally after a week's consideration by the commission. One month ago the body handed down an opinion cutting the valuation of the company from $950,000 to $750,000, thereby cutting the rate-making basis of the company. The latter appealed on the grounds that the inspection and examination by expert engineers trained in appraisal work was not sufficiently at variance from that of the company to justify the decrease made in the duplication value.

In order to hasten final adjudication of the case, without the possibility of further delay, the state Public Utilities Commission has ordered a crew of six of the best engineers available, under the directorship of Mr. Jenks, to remain in Lima until the task has been completed. The appraisal will probably require several months.

After investigations that have continued over a year the state utilities commission has fixed the value of the holdings of the Cleveland Telephone Company at $7,600,763.49.

An appraisal was asked by the city council with the adoption of a resolution by Councilman J. J. McGinty. The ninth ward councilman urged that the appraisal be

made after going over the situation with former Public Service Director T. L. Sidlo.

According to word from Columbus on the subject, the valuation was determined after the company and the state had each made a careful detailed investigation of the plant and appraised each item that goes into the whole plant. After all of the facts were in its hands the utilities commission went over all the information and fixed the reproductive value at $8,264,202.96.

From this sum it deducted $663,439.47 as the charge for depreciation, leaving the net value at the figure above. The action of the commission establishes the final value unless there is an appeal.

Two inspectors representing the Public Utilities Commission of Ohio were in the city for some time investigating the telephone service furnished by the Central Union Telephone Company. They concluded their investigation and left for Columbus after thoroughly studying local conditions.

The inspectors were E. W. Lutz and C. Burr Forrest, both of Columbus, with the official title of assistant to the telephone expert of the utilities commission. While not making a formal report of their findings they stated today that the whole trouble is due to the fact that the ciy has ougrown the phone company's facilities.

"We have seen the approvals for this equipment," they declared, "and there is no question but that the company is sincere." The new material includes switchboards, cables, wire and the like and the estimated cost is over $300,000.

Oklahoma

Complaint of the Farmers' Telephone Line of Grove against the United Telephone Company of Afton was dismissed by the corporation commission, the matters complained of having been adjusted since the United company was purchased by the Pioneer.

Washington

All obsolete rates which are being paid by subscribers to the Pacific Telephone & Telegraph Company which are the result of long-standing contracts were terminated and a standard series of rates were obtained in the order of the state Public Service Commission served to the Pacific company. The service of the orders ended a case that has been in the hands of the utilities commission for the past two years and which has been in the course of settlement ever since the Public Service Commission was organized.

The present exchange and toll rates of the company were adjudged "not unreasonable" by the commissioners, and a new set of rules governing the rules, regulations and practices of the company, which were jointly drawn up by the engineers of the company and the Public Service Commission, were authorized to replace the old rules.

In the findings of the commission there was made public a great mass of information regarding the business of the company. The aggregate earnings on exchanges were found to be far from excessive by the commission, and in no particular exchange was the rate found to be unfair. The commissioners' opinion is that the present rates of the toll charges which were filed with the commission one year ago are not unreasonable under the existing conditions of plants and traffic.

The new rules govern, for the most part, the provision for the credit deposits and the provision of extra charge of installation when that installation is costly. The regulations make provision for an optional method of establishing the subscriber's credit, fixes a minimum credit deposit for a telephone in a business house at twice the monthly rate and in a home at the monthly rate for telephone service, and requires that an unimpaired deposit be paid after 12 months of service. A 6 per cent rate of interest is allowed to the subscriber on his deposit.

The report of the company's condition shows that its rate basis, or the fair valuation on its property in the state, is $19,382,209. From this $208,858.20 is to be deducted since the company has shown that this is the value of property that is unused and useless.

The statement of revenue shows that the valuation of the company's equipment in Tacoma is $2,425,826; the gross revenue, $424,546; the expenses, $440,977; the annual loss, $16,421; the per cent of loss, .68.

The total revenue of the company in the state is $461,685 or a profit of 2.38 per cent. Under the new rates, the estimated per cent of profit will be 2.79.

City rates for Seattle service will be granted to all telephone users in the quarter-mile strip north of the city limits and between Lake Washington and Puget sound under the terms of an order entered by the Public Service Commission. The Pacific Telephone Company has agreed to the order. This gives better service to the people in this district, who in the future will get a four-party line service instead of a ten-party line service for $2.50 per month.

Wisconsin

By stipulation of the attorneys Judge Stevens of the Circuit court entered judgment against the Door County Telephone Company and in favor of the state for a penalty of $700 for failure of the company to comply with an order of the railroad commission.

In November, 1914, the commission ordered the company to make certain improvements and directed that monthly reports be filed in the office of the commission of the progress of the work of construction and installation and other acts and things to be done in compliance with the order. The commission alleged that the company failed and neglected to file reports and 15 separate causes of action were brought. The state demanded a penalty of $10,000 for each cause, making a total of $150,000.

By stipulation the minimum penalty, which is $100, was imposed for each of the first seven causes of action and the remaining eight causes were dismissed.

The Wisconsin Railroad Commission has dismissed a petition of the Bangor Telephone Company for an order requiring the Milwaukee road to change its high tension signal system at Bangor, so as not to interfere with the telephone service.

West Virginia

Four telephone companies, operating in West Virginia as the Bell System, with 45,000 stations, have asked the West Virginia Public Service Commission permission to consolidate and operate as the Chesapeake & Potomac Telephone Company.

Accounting Classifications

Interstate Commerce Commission's Interpretations, From Its Accounting Bulletin No. 11

AT A general session of the Interstate Commerce Commission, held at its office in Washington, D. C., on the 26th day of June, 1916, the subject of a Uniform System of Accounts to be prescribed for and kept by telephone companies being under consideration, the following order was entered:

That the interpretations of the accounting classifications for telephone companies, prepared under the direction of the Commission and embodied in printed form to be known as Accounting Bulletin No. 11, be approved; that a copy of said bulletin duly authenticated by the secretary of the Commission be filed in its archives, and a second copy thereof, in like manner authenticated, in the office of the Division of Carriers' Accounts; and that each of said copies so authenticated and filed shall be deemed an original record thereof.

That the accounting methods directed in the interpretations contained in the said Accounting Bulletin No. 11 be prescribed for the use of telephone companies having annual operating revenues exceeding $10,000, and subject to the provisions of the Act to Regulate Commerce, as amended, in the keeping and recording of their accounts.

That July 1, 1916, be fixed as the date on which the said Accounting Bulletin No. 11 shall become effective, the same to remain in effect until otherwise ordered by the Commision.

TO TELEPHONE COMPANIES (CLASSES A, B, AND C)

Systems of accounts for telephone companies subject to the jurisdiction of the Interstate Commerce Commission have been issued under the authority contained in section 20 of the act to regulate commerce. The Uniform System of Accounts for Class A and Class B telephone companies became effective January 1, 1913, and a supplement thereto became effective on January 1, 1915. The Uniform System of Accounts for Class C telephone companies became effective on January 1, 1915. This accounting bulletin contains answers to accounting questions which have been raised since the issuance of the systems of accounts and is published in order that uniformity may be had in the application of the rules laid down in the systems of accounts. It is supplementary to, and should be used in conjunction with, the systems of accounts prescribed for Class A, Class B, and Class C companies.

In the preparation of this bulletin the Commission has had the co-operation of a joint accounting committee representing practically all of the large telephone companies and a large number of the small companies. This bulletin was submitted in tentative form to the commissions of the several states having supervision of telephone companies and criticisms and suggestions were invited. Those received have been given careful consideration in the completion of the bulletin as now issued.

INTERPRETATIONS OF ACCOUNTING CLASSIFICATIONS EMBODIED IN THE UNIFORM SYSTEMS OF ACCOUNTS FOR TELEPHONE COMPANIES.

Note.—In the answers to cases references are usually made to the Class A and Class C accounts. Where the accounts shown are for Class A companies and the same accounts are not prescribed for Class B companies in the Uniform System of Accounts, Class B companies should interpret the answers as applying to their particular account of which the Class A account is a subdivision. Where no reference is given to specific accounts the case applies to all three classes of companies unless it specifically indicates otherwise.

CASE 1.

Query. Is it required that the titles of the accounts carried on the company's books correspond with the titles of accounts in the Uniform Systems of Accounts?

Answer. The Uniform Systems of Accounts prescribed by the Commission contain the titles and texts of the various accounts and require that companies keep their accounts in conformity therewith. Balance-sheet accounts which are clearly summaries of other accounts are not required to be set up on the books of the company (see sec. 3, p. 13, of the Uniform System of Accounts for Class A and B companies). All accounts kept on the company's books shall conform in titles to those prescribed by the Commission except as follows:

(1) Subaccounts as provided in section 1, page 9, of the Uniform Systems of Accounts and such subdivisions of prescribed balance-sheet accounts as are permitted (see sec. 3, p. 13, of the Uniform System of Accounts for Class A and B companies). All such subaccounts or subdivisions shall give reference by title, number, or both, to the accounts of which they are subdivisions. When such subaccounts or subdivisions are maintained, it is not required that the main account of which they are subdivisions shall be kept on the company's general books.

(2) Experimental or temporary accounts for which special provision is made in the Commission's orders on page 6 of the Uniform Systems of Accounts.

(3) Clearing accounts (other than those provided for Class A and B companies) necessary in making the proper distribution of items to appropriate primary accounts.

CASE 2.

Query. To what extent should detailed information be shown in the general books of telephone companies?

Answer. The records shall be kept with sufficient particularity to show fully the facts pertaining to all entries made in the accounts. Where the full information is not recorded in the general books, the entries therein shall be supported by other records in which the full details shall be shown. Such general book entries shall contain sufficient reference to the detail records to permit ready identification of the latter, and the detail records shall be kept in such manner as to be readily accessible when required for examination by representatives of the Interstate Commerce Commission.

CASE 3.

Query. What is the significance of the term "balance sheet," as used in section 5, page 13, of the Uniform System of Accounts for Class A and B companies?

Answer. The belance sheet referred to in section 5 is the balance sheet contained in the reports required by the Interstate Commerce Commission.

CASE 4.

Query. May account No. 102, "Reserve for accrued depreciation—Cr." (Class C, account No. 185), be subdivided between the amount applicable to fixed capital (or plant and equipment) installed prior to the effective date of the system of accounts and that installed since that date?

Answer. Yes; but the subdivision is not required. Section 1, page 9, of the Uniform Systems of Accounts for Class A. B, and C companies permit the subdivision of any account, provided the integrity of the main account is not impaired.

CASE 5.

Query. If subaccounts for "reacquired securities," referred to in section 5, page 13, of the Uniform System of Accounts for Class A and B companies, are carried on a company's ledger, are such subaccounts debit or credit accounts when appearing (1) under an asset account and (2) under a liability account?

Answer. Such subaccounts are debit accounts, when under an asset account; and credit accounts, when under a liability account. The subaccounts are of the same nature as the principal accounts of which they are a part.

CASE 6.

Query. How should securities, sometimes termed "treasury securities," signed and sealed and placed with the proper officer for sale and delivery, be accounted for in the balance-sheet accounts?

Answer. The same treatment shall be accorded "treasury securities" as is provided for "reacquired securities" in section 5, page 13, of the Uniform System of Accounts for Class A and B companies. (*See Case* 5.)

Class C companies may carry such securities at par in account No. 110, "Securities," and in account No. 160, "Capital stock" or No. 165, "Funded debt," as may be appropriate, but

in stating the balance sheet in reports to the Interstate Commerce Commission the par value of such securities shall be shown as deductions from the totals of these accounts.

CASE 7.

Query. What should be the accounting for a note carried in account No. 105, "Investment securities" (Class C, account No. 110), upon which payment of principal has been defaulted?

Answer. Transfer to account No. 117, "Bills receivable" (Class C, account No. 120), or to account No. 110, "Advances to system corporations for construction, equpiment and betterments" (Class C, account No. 120), as may be appropriate. If the asset is of doubtful value, the transfer may be to account No. 136, "Other suspense" (Class C, account No. 150), pending the final disposition of the matter.

CASE 8.

Query. What should be the accounting for accruals of depreciation on investments in physical property carried in Class A and B account No. 111, "Miscellaneous investments" (Class C, account No. 105)?

Answer.—Charge the accruals to account No. 303, "Other operating expenses" (Class C, account No. 340), if on operated property, or to account No. 320, "Rent expense" (Class C, account No. 340), if on nonoperated property, and credit account No. 170A, "Other deferred credit items" (Class C, account No. 190).

CASE 9.

Query. What should be the accounting for commissions paid to brokers for the purchase of the securities of other companies?

Answer. The amount of such commissions shall be considered as a part of the cost of the securities purchased.

CASE 10.

Query. To what account should be charged the cost of buildings and land not used in telephone operations and held for sale?

Answer. Account No. 111, "Miscellaneous investments" (Class C, account No. 105).

CASE 11.

Query. To what account should be charged the cost of buildings built to rent on land which is held for future central office or other telephone purposes?

Answer. The cost of such buildings shall be charged to account No. 111, "Miscellaneous investments" (Class C, account No. 105). The cost of land held for future telephone purposes shall be charged to account No. 211, "Land" (Class C, account No. 210).

CASE 12.

Query. What should be the accounting for rents received from and expenses in connection with property carried in account No. 111, "Miscellaneous investments" (Class C, account No. 105), and leased to others?

Answer. Credit rents received to account No. 311, "Miscellaneous rent revenues" (Class C, account No. 320), and charge expenses to account No. 320, "Rent expense" (Class C, account No. 320).

CASE 13.

Query. What should be the accounting for profits realized or losses sustained when securities of other companies carried in account No. 105, "Investment securities," or account No. 116, "Marketable securities" (Class C, account No. 110), are sold for more or less than the value at which they are carried on the accounting company's books?

Answer. Credit profits from sale of securities to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195), and charge losses to account No. 417, "Other deductions from surplus" (Class C, account No. 195), except where provision for loss has been made in a reserve account.

CASE 14.

Query. What is the general distinction between Class A company accounts No. 113, "Cash," and No. 114, "Special deposits"?

Answer. Account No. 113 should include all items of cash or deposits which are subject to the control of the company and available for current general requirements.

Account No. 114 should include all items of cash or special deposits which, although remaining "working assets" of the company, are not available for current requirements. (*See case* 22.)

"Time deposits" (usually covered by certificates of deposit), although technically not available for current requirements, as a practical matter generally are available and, if such is the case, may be included in account No. 113.

CASE 15.

Query. Is it required that Class A company account No. 114, "Special deposits," be set up to cover declared dividends?

Answer. No. Dividends may be paid from general cash, in which event it is not required that account No. 114 be used. This account should be used only when special deposits for this purpose are actually made.

CASE 16.

Query. Should the term "deposits to pay declared dividends and matured interest" in the definition of Class A company account No. 114, "Special deposits," be held to cover an undivided sum paid to mortgage trustees in satisfaction of the interest on a bond issue?

Answer. No. If the payment to the trustees satisfies the liability the amount should be charged to the appropriate interest liability accounts, and account No. 114 is not involved.

CASE 17.

Query. Is it required that all materials and supplies be carried through the materials and supplies account?

Answer. No. Materials and supplies purchased for a specific project or for immediate use may be charged directly to the accounts affected and need not be carried through account No. 122, "Materials and supplies" (Class C, account No. 135).

CASE 18.

Query. What should be the accounting for discounts realized through prompt payment and interest payable through delayed payment of bills for materials and supplies?

Answer. Materials and supplies shall be charged to the accounts at their catual cost in cash, or its equivalent, to the accounting company.

Discounts realized for the prompt payment of bills shall, as far as possible, be applied as credits to the accounts charged with the particular bills or invoices involved.

Discounts realized which can not be credited to the accounts charged with the particular bills or invoices involved shall be credited to account No. 704, "Supply expense" (Class C, account No. 135).

Interest on delayed payments shall be charged to account No. 336, "Other interest deductions" (Class C, account No. 360).

CASE 19.

Query. Do the Uniform Systems of Accounts require that assets be specifically set aside to cover sinking fund appropriations?

Answer. No. The setting aside of assets usually depends upon the provisions of the mortgage or upon the policy of the company. If assets are set aside they shall be carried in account No. 125, "Sinking fund assets" (Class C, account No. 140).

CASE 20.

Query. What should be the accounting for payments received and expenses incurred in the performance of custom work for others?

Answer. The expenses, including percentages added for supervision, use of tools, profit, etc., may be charged and the payments received may be credited to a suspense account, carried under account No. 120, "Miscellaneous accounts receivable" (Class C, account No. 130); any net profit from such transactions shall be credited to account No. 316, "Miscellaneous nonoperating revenues" (Class C, account No. 320). If the amounts involved are small, the expense may be charged to the appropriate operating expense accounts and the payments received shall, in such cases, be credited to the accounts previously charged.

CASE 21.

Query. What should be the accounting for amounts paid or received for options to bind a proposed purchase, sale, or lease?

Answer. Amounts paid for options shall, pending their final disposition, be charged to account No. 136, "Other suspense" (Class C, account No. 150). If the general project for which the option was obtained is finally carried out, the cost of the option shall be considered as part of the price or rental paid and charged to the appropriate asset, income, or other account. If the general project is finally abandoned, the cost shall be charged to account No. 417, "Other reductions from surplus" (Class C, account No. 195).

Amounts received for options given by the company shall, pending their final disposition, be credited to account No. 170A, "Other deferred credit items" (Class C, account No. 190). If the transaction is made as contemplated, the amount received shall be considered as a part of the price or rental received and credited to the appropriate accounts. If the option is forfeited, the amount originally received by the company shall be credited to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195).

CASE 22.

Query. To what account should be charged amounts deposited with municipalities to guarantee the proper restoration of street paving and other deposits with public authorities, the making of which does not rest solely within the company's discretion?

Answer. If it is probable that the funds can be withdrawn within one year from the date of deposit, charge account No. 114, "Special deposits" (Class C, account No. 115). If it is

probable that funds can not be withdrawn within one year charge account No. 136, "Other suspense" (Class C, account No. 150), since in such cases the deposits could not be considered working assets of the company. (*See Case* 14.)

CASE 23.

Query. Should notes, given when money is borrowed under an arrangement requiring a series of partial payments which commence within a year but extend over a period longer than one year, be treated as funded debt or notes payable?

Answer. Such notes shall be treated as funded debt and credited to account No. 153, "Funded debt" (Class C, account No. 165).

CASE 24.

Query. A company makes deductions monthly from the salaries of its employees and credits the amounts deducted to a hospital fund account. Against this account are charged the expenses of employees at private hospitals. In what account on the balance-sheet statement shall the liability for the unexpended portion of such funds be shown?

Answer. Account No. 170, "Liability on account of provident funds" (Class C, account No. 190).

CASE 25.

Query. Section 9, page 32, of the Uniform System of Accounts for Class A and B companies provides that all property having an expected life of more than one year (except small tools) shall be charged to fixed capital. There are other items of small value, which, while having an expectation of life of more than one year, are difficult to keep record of and are likely to be lost. May such items be charged direct to operating expenses?

Answer. Individual items of small value (e. g., amounts less than $5) classable as general equipment under accounts Nos. 260 to 265 (Class C, account 260), even though having an expectancy of life of more than one year, may be charged direct to the operating expense accounts or through the clearing accounts.

CASE 26.

Query. How should the "term of life" of items included in account No. 204, "Other intangible capital," be computed, especially in connection with those items referred to in section 13 of the Uniform System of Accounts for Class A and Class B companies?

Answer. The term of life of such intangible items should be determined by the purchasing company. In general, it should represent that period during which the intangible value may be expected to exist in the property apart from the life of the physical units to which it is related.

CASE 27.

Query. When a going or completed plant has been purchased, how should the appraisal be made of duplicate or otherwise useless items which must be retired by the purchasing company?

Answer. If it is reasonably certain at the time when the appraisal is completed that some items of property must be disposed of within a year after the date of purchase, such items may be appraised at their salvage value; otherwise at "structural value" (see sec. 13, p. 33, of the Uniform System of Accounts, Class A and B companies). Particular care must be taken to follow these retirements so that upon completion the prescribed accounting will have been effected.

CASE 28.

Query. Does the term "structural value" as used in section 13, page 33, of the Uniform System of Accounts for Class A and B companies, mean structural value to the buyer or to the seller?

Answer. The structural value to the buyer is meant.

CASE 29.

Query. What is the scope of the word "appraisal" as used in section 13, page 33, of the Uniform System of Accounts for Class A and B companies?

Answer. The requirement that an appraisal be made for all property purchased does not mean that the properties should necessarily be physically inventoried. When other and more economical methods exist for obtaining, with reasonable accuracy, the information required in the appraisal, it is permissible to use such other methods. If a physical inventory is not taken, however, records shall be kept showing upon what basis the appraisal was made and the facts, expert opinions, and estimates upon which the figures were determined.

CASE 30.

Query. What items should be classified as "going or completed plant" under section 13, page 33, "Plant and equipment and other property purchased" of the Uniform System of Accounts for Class A and B companies?

Answer. The term "going or completed plant" is intended to cover only the entire plant of a telephone company or an important unit thereof; such as—

(1) A telephone company as a whole,
(2) An entire central office,
(3) A system of lines and stations within a given area, or
(4) A complete section of toll plant.

The purchase by one company from another of several poles and appurtenances, a switchboard, or other minor portions of plant shall be treated in the same manner as the purchase of materials and supplies; i. e., the purchasing company shall charge the fixed capital accounts at cost, as provided in section 10, page 33, of the Uniform System of Accounts for Class A and B companies.

CASE 31.

Query. How should the following sentence, appearing in section 14, page 34, of the Uniform System of Accounts for Class A and B companies, be interpreted: "The entry of the credit to the fixed capital account should cite, by name and page of book or other record, the original entry of cost of the thing withdrawn"?

Answer. These instructions should be applied literally when large units of property, such as buildings, automobiles, large units of repair-shop machinery, and, in general, all other items which the company recognizes and records separately on its books, are involved. When small items and certain relatively large items are handled in such a volume as to require the use of averages, which are based upon accurate records, it is permissible to use average unit costs, and in such cases it will not be necessary to cite the original entry of cost of the thing withdrawn.

CASE 32.

Query. When private branch exchanges and booths and special fittings are retired from service and the fixed capital accounts credited, to what account should the original installation expense be charged?

Answer. Retirements of private branch exchanges and booths and special fittings shall be accounted for as provided in section 14, page 34 (Class C, sec. 13, p. 12) of the Uniform System of Accounts.

The treatment for the installation expense of stations as provided in account No. 607 (Class C, No. 620) is intended only for the retirements of stations and is not applicable to this class of property.

CASE 33.

Query. When contractors perform construction work for the telephone company what should be the accounting for amounts received from or paid to them under the following conditions:

(1) Amounts received in accordance with the terms of contract for delay in completion of work.
(2) Amounts received because of defective workmanship or material.
(3) Amounts received because of abrogation of contract in whole or in part.
(4) Amounts paid for completion of work before time specified.

Answer. (1) Amounts received, under the terms of the contract, for delayed completion of work shall be apportioned and credited to the accounts to which the cost of the work was charged. If, however, in connection with delayed construction additional amounts are collected in reimbursement of expenses incurred by or revenues lost to the telephone company, such amounts shall be credited to the appropriate revenue or expense accounts. (*See Case* 90.)

(2) If the telephone company corrects the defects, the cost of correcting shall be charged to the plant accounts and the amounts received from the contractor shall be credited to the accounts which were charged with the contract price. If the telephone company accepts the work without correcting the defective condition and charges the plant accounts with the full contract price, any amount recovered from the contractor shall be credited to the accounts which were charged with the contract price.

(3) Amounts received because of abrogation of contract shall be credited to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195).

(4) Amounts paid for completion of work before time specified shall be apportioned and charged to the accounts to which the cost of the work was charged.

CASE 34.

Query. What shall be the accounting for improvements on leased buildings?

Answer. In the case of leases where substantially the full benefit of improvements will be obtained, the cost of additions to, and betterments of, leased property shall be charged to a subaccount under the appropriate fixed capital (plant and equip-

ment) accounts. Depreciation and retirements in connection therewith shall be treated in the same manner as on company-owned property.

In the case of leases where ordinarily the full benefit of improvements will not be obtained and where any permanent improvements usually revert to the lessor at the expiration of the lease, the cost of improvements, including the moving of partitions and providing awnings, screens, shades, window ventilators, etc., shall be charged to account No. 133, "Other prepayments," (Class C, account No. 145) and cleared over a suitable period to account No. 610, "Other maintenance expenses" (Class C, account No. 640). Ordinarily the clearance period should be the period of the lease, but a shorter period should be used if the conditions are such that the improvements will be retired before the expiration of the lease.

The ordinary current repairs, also minor rearrangements and changes in connection with the leased buildings, shall be charged to the appropriate maintenance or other operating expense accounts.

Case 35.

Query. What should be the accounting for expenditures on property of others incurred in maintenance or construction work of the company?

Answer. Such expenditures, if borne by the company, shall be treated as a part of the cost of the work being conducted by the company, e. g., if in the construction of a toll pole line the company is obliged to relocate property of another company, the cost shall be charged to account No. 251, "Toll pole lines" (Class C, account No. 250).

Case 36.

Query. What should be the accounting for donations received in aid of construction?

Answer. The cost of construction shall be charged to the fixed capital (or plant and equipment) accounts in accordance with the rules contained in the Uniform Systems of Accounts.

Donations received from States, counties, municipalities, and other governmental bodies shall be credited to a subaccount entitled "Grants in aid of construction," and carried under No. 171, "Surplus invested since December 31, 1912, in fixed capital" (Class C, account No. 195). While such donations should be separately carried under an appropriate liability account and not classified as surplus, they may, until such time as the systems of accounts are reissued, be carried under account No. 171 (Class C, No. 195), as the most available under the current systems of accounts.

Donations received from individuals, firms, and corporations shall be credited to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195). If such donations are not subject to distribution as dividends, Class A and B companies shall also charge the amounts thereof to account No. 415, "Appropriations of surplus for construction, equipment, and betterments," and credit account No. 171, "Surplus invested since December 31, 1912, in fixed capital."

Case 37.

Query. What should be the accounting when a company sells a part of its property for a lump sum?

Answer. The primary fixed capital (plant and equipment) accounts involved shall be credited with amounts carried therein with respect to the property sold. The difference between the total amount thus credited and the amount received shall be treated as provided in section 14, page 34, of the Uniform System of Accounts for Class A and B companies; section 13, page 12, for Class C companies.

Case 38.

Query. What should be the accounting when a telephone company grants to others for a lump sum a so-called permanent right (not right of way) to use a part of its property, or acquires similar rights?

Answer. The amounts received from the granting of such rights shall be credited, in total, by the grantor to a subaccount "Property rights granted—Cr." under account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270).

The amounts paid for such rights shall be charged, in total, by the grantee to a subaccount "Property rights acquired" under account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270).

If the grantor subsequently reacquires any of the rights originally granted the subaccount "Property rights granted—Cr." shall be debited with the amount at which such rights are carried in that account. Similarly, if the grantee relinquishes any rights on the property of others, it shall credit the subaccount "Property rights acquired" with the amount at which such rights are carried in that account.

While these items differ from those usually carried in account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270) they may until such time as the systems of accounts are revised, be carried in that account under the subaccounts specified as the most available treatment under the current systems of accounts.

Case 39.

Query. What should be the accounting for amounts paid for temporary rights, such as pole or other attachments (not right of way), on the property of others, and for amounts received for similar rights given?

Answer. If compensation therefor is paid or received currently, the company obtaining such rights shall charge amounts paid to the appropriate rent deduction accounts, while the company giving such rights shall credit the appropriate rent account under Operating Revenues or Income.

If a lump sum is paid or received in advance for such rights, that amount should be given the usual treatment accorded prepaid items and cleared to the appropriate rent deduction or rent revenue accounts during the period covered by the right.

Case 40.

Query. Should the fixed capital accounts be charged with any portion of the pay and expenses of employees who are primarily engaged in maintenance and operation but who devote part of their time to construction work?

Answer. An equitable proportion of the salaries and expenses of such employees may be charged to the fixed capital (or plant and equipment accounts, but no charges shall be made to these accounts for merely incidental services of officers and employees whose time is regularly devoted to the operation and maintenance of the plant.

Case 41.

Query. To what account should be charged fees and expenses of attorneys other than regular employees of the company engaged in the preparation of legal papers required in the merger of one company with another?

Answer. Account No. 201, "Organization" (Class C, account No. 200).

Case 42.

Query. To what account should be charged the cost of plant or supplies given or leased to a municipality under the requirements of a franchise, minute, ordinance, resolution, contract, or other agreement?

Answer. If given as an initial consideration for a franchise extending for more than one year, charge account No. 202, "Franchises" (Class C, account No. 200); if given annually or at shorter periods charge account No. 673, "Telephone franchise requirements" (Class C, account No. 680).

If plant owned by the company is rented to a municipality without charge, charge first cost to the appropriate fixed capital (plant and equipment) accounts. Any maintenance costs incurred on such plant shall be charged to the appropriate maintenance accounts. (*See Case* 103.)

Case 43.

Query. To what account should be charged the cost to the company of sidewalks on public streets abutting the company's property?

Answer. Account No. 211, "Land" (Class C, account No. 210).

Case 44.

Query. What should be the accounting for pay station and other signs?

Answer. Signs shall be classified and accounted for as follows:

(1) General company signs, usually showing name of company and of a somewhat permanent character—

(*a*) Cut in stone or painted on buildings or general equipment: If in connection with company-owned buildings or equipment, charge appropriate fixed capital (or plant and equipment) account for buildings, general equipment, etc.

(*b*) Metal or wooden signs: Class as general equipment and charge appropriate fixed capital (or plant and equipment) account.

(c) Repairs and replacements shall be treated in the same manner as repairs and replacements of other telephone plant.

(2) Departmental signs, usually placed on doors, windows, or walls for the guidance of the public, but not for the purpose of attracting traffic, and generally of relatively short life: Charge appropriate expense account of particular department involved, except for the first cost of signs in a new company-owned building, which should be treated as part of the cost of the building.

(3) Public signs, installed to attract traffic and for guidance to public pay stations—

(*a*) If of relatively large value and long life, e. g., large electric signs, class as general equipment and charge appropri-

ate fixed capital (or plant and equipment) account. Expenses in connection with such signs shall be charged to account No. 642, "Advertising" (Class C, No. 680).

(*b*) If of small value or short life, e. g., metal, glass, paper, cardboard, or decalcomania devices, charge the cost to account No. 642 (Class C, No. 680).

CASE 45.

Query. To what account should be charged the cost of a retaining wall built on a company-owned lot?

Answer. Account No. 212, "Buildings" (Class C, account No. 210).

CASE 46.

Query. Should account No. 212, "Buildings" (Class C, account No. 210), include all items classified in the definition of this account without regard to the amount involved?

Answer. No. When single additions to or replacements in buildings are of small amount (for example, less than $5), the expenditure may be charged direct to the operating expense accounts or through the clearing accounts. (*See Case* 25.)

CASE 47.

Query. How should company-owned telephone equipment, installed and maintained by a railroad company or by other lessee, be carried in the asset accounts?

Answer. Charge the cost to the telephone company of such items to account No. 220, "Central office equipment," or account No. 230, "Station equipment," or the subaccounts thereunder (Class C, account No. 220 or No. 230), as may be appropriate.

CASE 48.

Query. To what account should be charged the cost of protectors installed in connection with central-office telephone equipment?

Answer. Such protectors when installed within a central-office building, whether mounted on the main distributing frame, or on racks, or in a box attached to the interior building wall, shall be charged to account No. 221, "Central-office telephone equipment" (Class C, account No. 220). If mounted outside the building, the charge shall be made to the appropriate cable or wire account.

CASE 49.

Query. To what account should be charged the cost of creating phantom circuits?

Answer. Account No. 221, "Central office telephone equipment" (Class C, account No. 220), and the appropriate cable or wire accounts (exchange or toll), according to the class of plant worked upon.

CASE 50.

Query. To what account should be charged the cost of a balcony built to reach the upper part of the main frame?

Answer. Account No. 221, "Central office telephone equipment" (Class C, account No. 220).

CASE 51.

Query. To what account should be charged the cost of Loading coils designed primarily for use in central offices offices?

Answer. Loading coils designed primarily for use on poles should be charged to the same account as is charged the circuit of which they are a part, even though such loading coils may occasionally be used in central offices or test stations.

Loading coils designed primarily for use in central offices should be charged to account No. 221, "Central office telephone equipment" (Class C, account No. 220).

CASE 52.

Query. To what account should be charged the initial cost of furniture and fixtures and the cost of repairs and replacements thereof?

Answer. (1) The first cost of furniture and fixtures shall be charged to the fixed capital accounts as follows:

Class A and B companies charge to—

No. 222. "Other equipment of central offices."—Furniture and fixtures in the operating and terminal rooms of central offices, in operators' schools and in rest and lunch rooms.

No. 235. "Booths and special fittings."—Furniture and fixtures at public pay stations.

No. 261. "Office furniture and fixtures."—Furniture and fixtures in general offices, division offices, and plant, traffic and commercial offices.

No. 262. "General shop equipment."—Furniture and fixtures in shops.

No. 263. "General store equipment."—Furniture and fixtures in storerooms and storehouses.

No. 264. "General stable and garage equipment."—Furniture and fixtures in stables and garages.

Class C companies charge to—

No. 220. "Central office equipment."—Furniture and fixtures in the operating and terminal rooms of central offices, in operators' schools and in rest and lunch rooms.

No. 260. "General equipment."—Other furniture and fixtures.

(2) The cost of repairs of furniture and fixtures, and of replacements when provision for replacements has not been made in the depreciation reserve shall be charged to the operating expense and clearing accounts, as follows:

Class A and B companies charge to—

No. 604. "Repairs of central office equipment."—The expense on furniture and fixtures carried in account No. 222.

No. 605. "Repairs of station equipment."—The expense on furniture and fixtures carried in account No. 235.

No. 666. "Other general office supplies and expenses."—The expense on furniture and fixtures carried in account No. 261, except where separate offices are maintained for the plant, traffic, or commercial forces, in which case the expenses should be charged to accounts Nos. 706, 621 to 633, inclusive, or 640 to 650, inclusive, respectively.

No. 701. "Shop expense."—The expense on furniture and fixtures in shops.

No. 702. "Stable and garage expense."—The expense on furniture and fixtures in stables and garages.

No. 704. "Supply expense."—The expense on furniture and fixtures in storerooms and storehouses.

Class C companies charge to—

No. 610. "Repairs of equipment."—The expense on furniture and fixtures carried in account No. 220.

No. 680. "Other general expenses."—The expense on furniture and fixtures carried in account No. 260.

(3) The cost of replacements of furniture and fixtures, when provision for the replacements has been made in the Depreciation Reserve, shall be handled through the fixed capital (or plant and equipment) accounts; that is, the cost of the property retired or replaced shall be credited to the appropriate fixed capital (or plant and equipment) accounts and the new property shall be charged thereto.

(4) Inventories or appraisals of the furniture and fixtures in use should, from time to time (preferably annually), be made at cost prices (estimated, if not known, and the fixed capital (plant and equipment) accounts shall be adjusted to the inventoried or appraised figures by charging or crediting the appropriate expense accounts or the depreciation reserve, if the latter account is affected.

(5) Companies whose investment in furniture and fixtures is not set up in accordance with the foregoing paragraphs may, upon obtaining special authority from the Commission, make the necessary adjustments in their fixed capital (plant and equipment) accounts.

(6 When furniture is used jointly by two or more departments, the principal function for which it is used should determine the fixed capital (plant and equipment) account to which the initial costs should be charged. Repairs and replacements of such furniture should be charged to the particular account under (2) or (3) above, in conformity with the plant account to which the cost of the furniture was charged.

CASE 53.

Query. What should be the accounting for the cost of awnings, door and window screens, window shades, and analogous items when installed in owned buildings?

Answer. These items are classed as furniture and fixtures and the initial cost, the cost of replacements, and the cost of repairs shall be accounted for in the same manner as for furniture and fixtures. (*See Case* 52.)

However, when a building is occupied by several departments of a telephone company, the cost of awnings, door and window screens, window shades, and analogous items, wherever installed, may at the option of the accounting company be charged to account No. 261, "Office furniture and fixtures" (Class C, account No. 260); in such cases, the maintenance expenses shall be charged to account No. 707, "House service expense" (Class C, account No. 640).

CASE 54.

Query. What accounts should be charged with the cost of chemical fire extinguishers?

Answer. Such equipment should be classed as furniture and fixtures and charged accordingly. (*See Case* 52.)

CASE 55.

Query. To what account should be charged the cost of "order table systems" installed for the use of department stores or other subscribers?

Answer. The cost of the order table, including the table wiring, equipment, table telephone sets and cost of installation, shall be charged to account No. 234, "Private branch exchanges" (Class C, account No. 230).

CASE 56.

Query. To what account should be charged the cost of pumping water out of manholes and of cleaning manholes and ducts to permit installation of new cable or for repair work on existing cables?

Answer. The expense of necessary pumping or cleaning in connection with the maintenance or operation of the plant shall be charged to account No. 603, "Repairs of underground plant" (Class C, account No. 600).

The cost of any pumping or cleaning in connection with new construction and not necessary in the maintenance or operation of the plant shall be charged to the appropriate fixed capital (plant and equipment) accounts.

CASE 57.

Query. To what account should be charged the installation cost of bridle-wire cables used to connect open-wire circuits with cable circuits or with central office equipment?

Answer. When used to connect open-wire circuits with cable circuits, charge aerial, underground, or submarine cable, toll or exchange, in accordance with the classification of the cable connected.

When used to connect open-wire circuits with central-office equipment, charge aerial or underground cable, toll or exchange, in accordance with the nature of the run to the central office, and the classification of the circuits on the pole line.

CASE 58.

Query. To what account should be charged the cost of electrolytic surveys made to ascertain the cable protection needed against electrolysis?

Answer. The original cost shall be charged to the cable construction account or accounts involved. Later surveys made during the life of such cable shall be charged to the repair accounts.

CASE 59.

Query. A type of cable is inclosed in a sheath of oakum and steel and is used underground without conduit or concrete. To what account should be charged the cost in place of such cable, including the cost of trench digging?

Answer. Account No. 245, "Exchange underground cable," or No. 225, "Toll underground cable" (Class C, accounts Nos. 240 or 250), as may be appropriate.

CASE 60.

Query. To what account should be charged the cost of a bond or negative return attached to the cable sheath, together with an electrolysis bond opener connected therein, and of plant to carry such apparatus?

Answer. Charge the cost of the bond or negative return and the bond opener to the same account as the cable protected. Charge the cost of the ducts, cross arms, poles, right of way, etc., used to carry such apparatus (or any portion thereof paid for by the accounting company) to the regular fixed capital (or plant and equipment) accounts. Attachment rentals paid to other companies for such privileges shall be charged account No. 332, "Rent deductions for conduits, poles and other supports" (Class C, account No. 680).

CASE 61.

Query. To what account should be charged the expense of special protection at a high potential line crossing?

Answer. Whether installed on the company's telephone lines or on the high potential line, charge account No. 241, "Exchange pole lines," or account No. 251, "Toll pole lines" (Class C, account No. 240 or No. 250), as may be appropriate with the original cost of the protective work, and charge any subsequent repairs thereon to account No. 602, "Repairs of aerial plant" (Class C, account No. 600).

CASE 62.

Query. Is it permissible to adjust the fixed capital accounts for general equipment upon the basis of periodical inventories to correct discrepancies arising during the year?

Answer. Yes. Adjustments to correct discrepancies arising during the current year may be made in accounts Nos. 260 to 265, inclusive (Class C, account No. 260). Concurrent charges or credits should be made to the appropriate expense accounts or to the depreciation reserve account, if the latter is affected. (*See Case* 52).

CASE 63.

Query. To what account should be charged the cost of cabinets, frames, and plates used with addressing machines?

Answer. The cabinets shall be charged to account No. 261, "Office furniture and fixtures" (Class C, account No. 260).

The frames, plates (or cards), and similar material, when purchased for revenue accounting purposes, should be charged to account No. 646, "Revenue accounting," otherwise to the appropriate expense account for printing and stationery (Class C, account No. 680).

CASE 64.

Query. Is it permissible to charge to account No. 268, "Interest during construction" (Class C, account No. 270) interest on the company's working funds used in construction work? If so, to what account should such interest be credited?

Answer. Account No. 268, "Interest during construction" (Class C, account No. 270) may be charged with interest accruing on the company's working funds used in construction work. If this is done a subaccount under account No. 313, "Interest revenues" (Class C, account No. 320) shall be credited.

CASE 65.

Query. To what account should be charged insurance premiums paid on construction material or on equipment or structures under construction?

Answer. Insurance premiums paid on construction material or on equipment or structures under construction shall be charged to specific plant accounts when direct allocation to such plant accounts is possible.

When such allocation is not possible, apportion the cost of premiums over the appropriate plant accounts or charge to account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270).

CASE 66.

Query. What should be the accounting for premiums on liability insurance covering accidents to persons or damages to the property of others during construction or operations?

Answer. Charge the cost of premiums to account No. 668, "Insurance" (Class C, account No. 680). Subsequently, the proportion of the premiums applicable to construction shall be credited to account No. 668 (Class C, 680) and charged to the particular plant accounts where direct allocation is possible. When such allocation is not possible, apportion the cost of premiums over the appropriate plant accounts or charge to account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270).

Premiums incident to construction work only shall be charged direct to the plant accounts affected or to account No. 274 (Class C, No. 270).

CASE 67.

Query. When funded debt securities which mature serially are sold in one lot at a flat discount rate upon the entire par value, how should the discount be amortized?

Answer. The discount and expense shall be charged to account No. 135, "Unamortized debt discount and expense" (Class C, account 150) and amortized through charges to account No. 338, "Amortization of debt discount and expense" (Class C, account 370) in such manner that the ratio between the amortization charges and the principal of the securities outstanding will be uniform for all fiscal periods.

For example: A company issues five $1,000 bonds, one maturing each year.

The debt discount and expense on the issue are $450. The distribution of the discount and expense should be as follows:

First year, principal outstanding, $5,000; amortization charge (rate, 3 per cent), $150.

Second year, principal outstanding, $4,000; amortization charge (rate, 3 per cent), $120.

Third year, principal outstanding, $3,000; amortization charge (rate, 3 per cent), $90.

Fourth year, principal outstanding, $2,000; amortization charge (rate, 3 per cent), $60.

Fifth year, principal outstanding, $1,000; amortization charge (rate, 3 per cent), $30.

CASE 68.

Query. To what account should be charged the cost of printing handbooks containing plant-accounting instructions and the cost of badges furnished plant department employees?

Answer. Account No. 706, "Plant supervision expense" (Class C, account No. 640).

CASE 69.

Query. To what account should be charged the expense of an examination of titles of real property and other matters affecting the validity of an issue of bonds?

Answer. If such expense is incurred in connection with the issuance of bonds it shall be charged to account No. 135, "Un-

amortized debt discount and expense" (Class C, account No. 150) and written off by charges to account No. 338, "Amortization of debt discount and expense" (Class C, account No. 370). If the expense has been incurred in a suit to test the validity of the bond issue it shall be charged to account No. 667, "General law expenses" (Class C, account No. 680).

CASE 70.

Query. How should the phrase "include as nearly as may be possible the total amount of the taxes in the period to which they apply," given in section 16, page 47, of the Uniform System of Accounts for Class A and B companies, be applied?

Answer. (1) Tax assessments for the Federal income tax, State gross revenue taxes and other large and important taxes pertaining to definite and known fiscal periods of the Federal Government, State or other large taxing districts, should be accrued through the months of the fiscal period to which the tax *applies.* At the end of a company's fiscal year, the sum of the monthly accruals should equal the estimated liability of the company as of that date for this class of taxes and, at the end of the period for which any tax is assessed, the accruals should equal the total of the tax assessment.

(2) Tax assessments, such as for school taxes, property taxes, poll taxes, wire mileage taxes, etc. (comprising the major portion of tax items), usually assessed by local authorities and covering fiscal periods more or less uncertain, may be accrued through the months of the fiscal period *in which they must be paid.* At the end of the company's fiscal year, the monthly accruals made during the year should equal *payments.* In making accruals, it is unnecessary to consider each tax separately, but rather the whole class should be considered by means of general comparisons with similar periods of preceding years, expected changes, etc.

CASE 71.

Query. What should be the accounting for taxes on materials and supplies carried in stock?

Answer. Taxes on materials and supplies carried in stock should, as a general rule, be charged to account No. 305, "Taxes assignable to operations" (Class C, account No. 350). In specific cases, however, where materials and supplies are definitely assigned to be used in construction work, the proportion of taxes applicable to such materials and supplies may be allocated to the appropriate plant accounts or charged to account No. 273, "Taxes during construction" (Class C, account No. 270).

CASE 72.

Query. When the expenses of a State utilities commission are borne by the utilities and apportioned among them, to what account should be charged a company's proportion of such expenses?

Answer. Account No. 305, "Taxes assignable to operations" (Class C, No. 350).

CASE 73.

Query. To what accounts should be charged the cost, when borne by the company, of internal revenue stamps required under the act entitled "An act to increase the internal revenue, and for other purposes," approved October 22, 1914?

Answer. The cost of internal revenue stamps purchased directly from the Government or its agents should, as a general rule, be charged to account No. 305, "Taxes assignable to operations" (Class C, account No. 350). In important and exceptional cases other appropriate accounts shall be charged; e. g., the expense of stamps in connection with new issues of capital stock shall be charged to account No. 201, "Organization" (Class C, account No. 200); the expense of stamps in connection with new construction work shall be charged to the appropriate fixed capital (plant and equipment) accounts, and the expense of stamps in connection with the issuance of funded debt shall be charged to account No. 135, "Unamortized debt discount and expense" (Class C, account No. 150) and amortized over the life of the debt.

Indirect expenditures for internal revenue stamps shall be charged to the appropriate departmental or other accounts; e. g., when an express company affixes stamps to bills of lading and transfers the charge to the telephone company the cost should be included as a part of the cost of transportation.

CASE 74.

Query. To what account should franchise taxes paid periodically be charged?

Answer. Account No. 305, "Taxes assignable to operations" (Class C, account No. 350).

CASE 75.

Query. To what account should be credited rentals from instruments leased to connecting companies?

Answer. Account No. 311, "Miscellaneous rent revenues" (Class C, account No. 320). This does not apply to the case where instruments and general supervision are furnished under an agreement for apportioning the revenues of the licensee. In this case, account No. 526, "Licensee revenue—Cr." (Class C, account No. 530) shall be credited.

CASE 76.

Query. When in connection with collateral trust bonds, the trustee holds certain securities against the contingency of default by the debtor company, the income on such collateral being the property of the debtor company, to what account should such income be credited?

Answer. Account No. 312, "Dividend revenues" or account No. 313, "Interest revenue" (Class C, account No. 320) as may be appropriate.

CASE 77.

Query. What is the significance of the phrase "if the fund is required to be represented by a reserve" in Note B under Class A and B account No. 314, "Sinking and other reserve fund accretions"?

Answer. The phrase refers to the provision of the deed of trust or other contract, or to the policy of the company, and not to any requirement of the Uniform System of Accounts.

CASE 78.

Query. The text of accounts No. 335, "Interest deductions for funded debt" (Class C, account No. 360), and No. 314, "Sinking and other reserve fund accretions," excludes interest on securities issued or assumed by the company. A company has in a sinking fund both securities of its own issue and securities assumed by it, the interest on which under the terms of the mortgage is to accumulate in the fund. What should be the accounting for such interest?

Answer. If the deed of trust or policy of the company requires that the interest accruing on such securities accumulate to the sinking fund, the accounting for the interest shall be as follows:

(1) Class A and B companies shall charge amounts equal to such interest to account No. 350, "Appropriations of income to sinking and other reserve funds," and credit similar amounts to account No. 172, "Surplus invested in sinking funds." When the cash is turned over to the trustees, or to the fund, charge account No. 125, "Sinking fund assets," and credit account No. 113, "Cash." If no reserve is to be set up to cover the fund the charge to account No. 350 and credit to account No. 172 should

(2) Class C companies shall charge amounts equal to such interest to account No. 370, "Miscellaneous charges to income," and credit a subaccount under account No. 195, entitled "Surplus invested in sinking funds." When the cash is turned over to the be omitted.
trustees or to the fund, charge account No. 140, "Special funds," and credit account No. 115, "Cash." If no reserve is to be set up to cover the fund, the charge to account No. 370 and credit to account No. 195 should be omitted.

CASE 79.

Query. To what account should be charged the amounts of bills covering the sale of small quantities of supplies or the cost of work done for others, which have proved to be uncollectible?

Answer. Account No. 323, "Uncollectible nonoperating revenues" (Class C, account No. 680). Charges to subscribers for moves and changes of telephone equipment which have been credited to account No. 607, "Station removals and changes" (Class C, account No. 620), in anticipation of collection, and which have proved to be uncollectible, shall be charged to account No. 607 (Class C, No. 620).

CASE 80.

Query. What should be the accounting for maintenance and operating expenses in connection with, and rents received from, space leased to others in buildings partly occupied by the telephone company?

Answer. If the expenses of maintaining and operating the rented portion can be separated accurately from the expenses on the portion used by the company, such expense shall be charged to account No. 320, "Rent expense" (Class C, account No. 320), and the rent received shall be credited to account No. 311, "Miscellaneous rent revenues" (Class C, account No. 320). The expense on the portion of building used by the company shall be charged to the appropriate operating expense accounts.

If the expense on the rented portion can not be separated accurately, the entire expense shall be charged to the operating expense accounts, and the rent received shall be credited to account No. 505, "Minor rents of exchange plant" (Class C, account No. 500) if building is used by the company exclusively for exchange purposes, to account No. 515, "Minor rents of toll plant" (Class C, account No. 510) if building is used exclusively for toll purposes, or to account No. 524, "Rents from other operating property" (Class C, account No. 520) if building is used for both exchange and toll purposes.

In the case of a large property, where the company uses only a minor portion and the expenses can be apportioned on an

equitable basis, it is desirable to use accounts Nos. 311 and 320 (Class C, No. 320).

Case 81.

Query. What should be the accounting when a lessee company pays interest or dividends on the securities of a lessor company in accordance with the terms of the rental agreement between them?

Answer. The amounts so paid shall be charged by the lessee to account No. 330, "Rent deductions for lease of telephone plant" (Class C, account No. 370), and credited by the lessor to account No. 310, "Rent revenues from lease of telephone plant" (Class C, account No. 320).

Case 82.

Query. To what account should be charged the cost of minor work done in lieu of cash payments for pole locations, poles, and other supports, e. g., maintenance of telegraph lines of a railroad company in return for right-of-way privileges?

Answer. Account No. 602, "Repairs of aerial plant" (Class C, account No. 600).

Case 83.

Query. To what account should be charged amounts paid periodically to a railroad company for permission to cross its right of way, the right being reserved to revoke the permission at pleasure?

Answer. Account No. 334, "Miscellaneous rent deductions" (Class C, account No. 680).

Case 84.

Query. To what account should be charged rents paid for pole locations?

Answer. Account No. 332, "Rent deductions for conduits, poles, and other supports" (Class C, account No. 680).

Case 85.

Query. To what account should be charged rents paid for the use of circuits?

Answer. Account No. 334, "Miscellaneous rent deductions" (Class C, account No. 680).

Case 86.

Query. What should be the accounting when property leased by the accounting company is subleased, in whole or in part, to others?

Answer. Property subleased to others shall be accounted for as if the accounting company were leasing its own property.

If, however, the accounting company acts only in the capacity of an agent without profit in leasing property for others, the receipts from lessee and the payments to lessor may be applied to the same primary account or cleared through a suspense account.

Case 87.

Query. The coupons on certain securities contain a stipulation that if not paid on date of maturity the coupons shall bear interest from that date. To what account should the interest on the coupons be charged?

Answer. Account No. 336, "Other interest deductions" (Class C, account No. 360).

Case 88.

Query. A company sells short-term notes because the money market does not warrant the sale of the bonds which are deposited as collateral for the notes. It is permissible to spread the discount on the notes over the life of the bonds, treating the sale and retirement of both notes and bonds as one transaction?

Answer. The sale and retirement of the notes shall be separately considered and the discount suffered on the notes shall be charged to account No. 336, "Other interest deductions" (Class C, account No. 360).

Case 89.

Query. To what account should be charged interest paid on taxes overdue and unpaid?

Answer. Account No. 336, "Other interest deductions" (Class C, account No. 360).

Case 90.

Query. What should be the accounting treatment in connection with delayed items of revenue, expense, or income?

Answer. Delayed items of revenue, expense, or income shall be credited or charged to the same account as would have been credited or charged if the items had been taken up in the period to which they pertained. If, however, the amounts involved are deemed sufficient to impair comparisons unduly and the company does not desire to charge them to the current accounts, adjustments may be made through the surplus or deficit accounts (Class A and B, accounts Nos. 401 and 417; Class C, account No. 195) upon obtaining special authority from the Interstate Commerce Commission.

Case 91.

Query. What should be the accounting treatment in connection with adjustments of errors in the revenue, expense, and income accounts of a prior fiscal year?

Answer. Errors in the revenue, expense, and income accounts of a prior fiscal year should be adjusted through the revenue, expense, and income accounts, respectively, of the year in which the errors are discovered. If, however, the amounts involved are deemed sufficient to impair comparisons unduly and the company does not desire to charge them to the current accounts, adjustments may be made through the surplus or deficit accounts (Class A and B, accounts Nos. 401 and 417; Class C, account No. 195) upon obtaining special authority from the Interstate Commerce Commission.

Case 92.

Query. To what account should be credited an amount received for the surrender of an unexpired lease on property?

Answer. Account No. 401, "Miscellaneous additions to surplus (Class C, account No. 195).

Case 93.

Query. When the securities of a telephone company are reacquired, and then resold at a price other than par, what should be the accounting for the difference between the sale price and the par value?

Answer. Credit any profit to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195), and debit any loss to account No. 417, "Other deductions from surplus" (Class C, account No. 195). The discount and premium accounts referred to in section 6, "Discount and premium on capital stock," and section 7, "Discount, expense and premium on funded debt," in the Uniform System of Accounts (Class C, accounts Nos. 150 and 190), are provided only for the initial sales of securities and are not applicable to the class of transaction under consideration.

Case 94.

Query. What should be the accounting for funds on deposit with a bank which has failed?

Answer. Pending the determination of the actual loss, such amounts shall be carried in account No. 136, "Other suspense" (Class C, account No. 150). When determined, the amount lost shall be charged to account No. 675, "Other general expenses" (Class C, No. 680); amounts recovered thereafter shall be credited to account No. 675 (Class C, No. 680).

Case 95.

Query. What should be the accounting for amounts billed subscribers under the following conditions:

(1) When the bill is rendered in gross amount and a discount allowed for payment within a specified period.

(2) When the bill is rendered in net amount and an additional amount is charged to subscribers who do not make settlement within a specified period.

Answer. (1) Either the gross or net amount of the bills may be recorded on the subscribers' ledger at the time the bills are rendered.

(*a*) If the gross amount of the bills is recorded on the subscribers' ledger, such discounts as are taken by subscribers shall be credited to their accounts and charged to account No. 500, "Subscribers' station revenue" (Class C, account No. 500), or other account to which the gross amount of the bill was previously credited.

(*b*) If the net amount of the bills is recorded on the subscribers' ledger, discounts neglected shall be entered against the appropriate subscribers' accounts at the end of the discount period and credited to account No. 500, "Subscribers' station revenues" (Class C, account No. 500), or other account to which the net amount of the bill was previously credited.

(2) The net amount of the bill shall be recorded on the subscribers' ledger. When the specified time for payment expires, the additional amount charged shall be entered against the accounts of such subscribers as have not made settlement and credited to account No. 500, "Subscribers' station revenues" (Class C, account No. 500), or other account to which the net amount of the bill was previously credited.

Case 96.

Query. The text of Class A and B account No. 304 permits companies to carry a subaccount under account No. 118, "Due from subscribers and agents," comprising a reserve for uncollectible revenue accounts. If this subaccount is kept, should it be closed out at the end of each year or may a balance be carried forward to the succeeding year?

Answer. If this method of accounting for uncollectible operating revenues is followed, there should be carried forward in this subaccount to the succeeding year a balance representing as nearly

as possible that proportion which will prove to be uncollectible of the total amount of outstanding bills for operating revenues.

If Class C companies desire to set up a reserve for uncollectible operating revenues, monthly charges should be made to account No. 370, "Miscellaneous charges to income," and concurrent credits to a subaccount under account No. 125, "Due from subscribers and agents." The balance in this subaccount at the end of the year should be treated as provided in the above paragraph. (*See Case* 97.)

CASE 97.

Query. What should be the accounting for operating revenues charged off as uncollectible but recovered later upon resumption of service or otherwise?

Answer. Credit the subaccount comprising the reserve for uncollectible accounts under account No. 118, "Due from subscribers and agents" (Class C, accounts No. 125), if such subaccount is kept; otherwise credit account No. 304, "Uncollectible operating revenues" (Class C, account No. 370). (*See Case* 96.)

CASE 98.

Query. To what account should be charged permit fees paid to municipalities, counties, and other governmental bodies in connection with the initial location of poles or conduits?

Answer. Account No. 207, "Right of way" (Class C, accounts Nos. 240 or 250, as may be appropriate).

CASE 99.

Query. To what account should be credited amounts received from other telephone companies as compensation for the terminal handling of toll messages?

Answer. Account No. 510, "Message Tolls" (Class C, account No. 510). In general, message toll revenue includes (1) the revenue from messages transmitted entirely over the company's own toll lines, (2) the company's proportion of revenue (usually termed "prorate" or "mileage") from messages transmitted partly over the company's own toll lines and partly over the toll lines of other companies, (3) amounts received as compensation for switching messages between the toll lines of other companies, and (4) commissions or amounts representing a division of revenue received as compensation for originating or terminating toll messages of other companies.

CASE 100.

Query. What should be the accounting for slugs, etc., and for counterfeit or mutilated coins collected from coin box stations?

Answer. Any necessary adjustment for such items shall be made through the Operating Revenue accounts since these shall include in such cases only the face value of the legal tender coin collected.

CASE 101.

Query. To what account should be charged amounts paid subscribers for directory or traffic service errors affecting telephone service?

Answer. Abatements of charges billed subscribers when allowed for directory or traffic service errors affecting telephone service shall be charged to the operating revenue account or accounts previously credited with respect to the particular service. (See sec. 19, p. 60, for Class A and B companies; accounts 500 and 510 for Class C companies.) Any additional payments resulting from such errors shall be charged to account No. 669, "Accidents and damages" (Class C, account No. 680).

CASE 102.

Query. To what account should be charged amounts paid in connection with errors in directory advertising?

Answer. Abatements of charges allowed for directory advertising errors shall be charged to account No. 523, "Advertising and directory" (Class C, account No. 520). Any additional payments resulting from such errors shall be charged to account No. 669, "Accidents and damages" (Class C, account No. 680).

CASE 103.

Query. What should be the accounting when telephone service is given at other than standard rates?

Answer. (1) If given to employees, ministers, charitable institutions, etc., credit the revenue accounts with the actual amounts, if any, charged for the service. No adjustment shall be made between the revenue and other accounts for the reduction from standard rates.

(2) If given in accordance with specific franchise requirements, including service given to municipalities for right of way, pole location, etc., charge the standard rates for such service to account No. 673, "Telephone franchise requirements" and credit similar amounts to account No. 676, "Telephone franchise requirements—Cr." (Class C, companies shall not include such items in either the revenue or expense accounts). (*See Case* 42.)

(3) If given for specific return other than to municipalities, e. g., for rights of way, advertising, etc., credit the revenue accounts at the standard rates for such service. Any reduction from standard rates shall be charged to the appropriate expense or income deduction account.

CASE 104.

Query. To what accounts should the exchange revenue from hotel or department store contracts and from guarantee coin box exchange service be credited?

Answer. 1. When such service is established specifically for general public use, the revenue shall be credited to account No. 501, "Public pay station revenues" (Class C, account No. 500) as follows:

(*a*) The total amount of the exchange service revenue billed under contract, or the amount collected with respect to exchange service from the coin box if equal to or in excess of the guarantee. Any commission or amount retained by or paid to the guarantor shall be charged account No. 648, "Pay station commissions" (Class C, account No. 680).

(*b*) The full amount of the guarantee if the amount collected from the coin box with respect to exchange service is less than the guarantee.

(2) When such service is not established specifically for general public use, the exchange service revenue billed or the full amount of the guarantee, plus whatever net additional amount is due the telephone company, shall be credited to account No. 500, "Subscribers' station revenues" (Class C, account No. 500).

(3) In exceptional cases when a telephone system, owned by a hotel, store, or other establishment, receives central-office service from the company, the revenue shall be credited to account No. 503, "Service stations" (Class C, account No. 500).

CASE 105.

Query. What is the proper accounting for messenger service receipts and disbursements which are incident to delivering messages and notifying persons of calls at telephone stations?

Answer. Messenger service revenue from subscribers and other telephone companies shall be credited to account No. 520, "Messenger service" (Class C, account No. 520).

The salaries paid to messengers who are in the company's employ shall be charged to account No. 630, "Messenger service" (Class C, account No. 660). Amounts paid to messengers who are not in the company's employ and amounts collected for and paid to other telephone companies for messenger service shall be charged to account No. 520, "Messenger service" (Class C, account No. 520).

CASE 106.

Query. To what account should be credited the rent received for rooms leased to the local manager for personal (nonofficial) use in a building rented by the telephone company for central office purposes?

Answer. Account No. 505, "Minor rents of exchange plant" (Class C, account No. 500) if building is used by the company exclusively for exchange purposes, to account No. 515, "Minor rents of toll plant" (Class C, account No. 510) if building is used exclusively for toll purposes, or to account No. 524. "Rents from other operating property" (Class C, account No. 520) if building is used for both exchange and toll purposes.

CASE 107.

Query. To what account should be credited unclaimed refunds on telephone service?

Answer. Account No. 525, "Other miscellaneous revenue" (Class C, account No. 520).

CASE 108.

Query. To what account should be credited unclaimed subscribers' deposits, dividends, and wages?

Answer. Such items should be carried under the appropriate accounts payable until the expiration of the company's liability. At the end of a fiscal year, or more frequently if advisable, items which have been carried for the required period shall be credited to account No. 401, "Miscellaneous additions to surplus" (Class C, account No. 195).

CASE 109.

Query. To what account should be credited revenue received from "battery taps," i. e., electrical power furnished others from the central office batteries?

Answer. Account No. 525, "Other miscellaneous revenue" (Class C, account No. 520).

CASE 110.

Query. When the duties of employees are varied and a small amount of time is spent on each duty, thus affecting a number of accounts, is it required that their pay and expense be distributed on the basis of the actual time spent?

Answer. The pay and expenses of employees shall be distributed to the accounts as nearly as may be possible on basis of the time actually spent on each class of work. However, if the time is so split up as to make such a distribution impracticable, and if the employee does the same classes of work from day to day, his pay and expenses may be distributed by the use of per-

centages based on a study of the time actually spent in a representative period, such percentages being corrected from time to time as the facts warrant.

CASE 111.

Query. When one department performs services or prepares data for another department, should any transfer of expense be made in the accounts?

Answer. When, in the ordinary conduct of business, it is necessary that one department perform services for or furnish data to another department, no transfer of expense is required.

Where the employees of one department perform an extensive service which is the function of another department, the expense shall be transferred to such department and charged to the accounts affected; but no transfer of expense is required to be made for incidental services performed for one department by another. For example, if the traffic department rates and sorts toll tickets, makes check ledger entries, and prepares reports to facilitate the work of the department performing the function of revenue accounting, such service being incidental to the work of the traffic department, the expense may be borne by the traffic department.

CASE 112.

Query. To what account should be charged the pay and expenses of managers at small exchanges who are engaged in constructing and maintaining the plant and in traffic and commercial operations?

Answer. Construction and maintenance costs shall be charged to the appropriate fixed capital (plant and equipment) and maintenance accounts, respectively, and the remainder shall be distributed to the appropriate traffic and commercial expense accounts. If it is impracticable to distribute the charges to the traffic and commercial expense accounts on the basis of actual time spent, the distribution may be made on a percentage basis.

CASE 113.

Query. To what account should be charged the commissions paid to exchange agents or managers in lieu of salary, operating expenses, etc.?

Answer. Any construction or maintenance costs having been first deducted and charged to appropriate accounts, the remainder shall be divided between Traffic and Commercial Expenses by means of percentages agreed upon by these departments. Class C companies, after charging construction and maintenance accounts according to fact, shall charge the remainder to account No. 670, "General office salaries."

CASE 114.

Query. To what account should be charged the pay and expenses of foremen and subforemen of repair gangs?

Answer. Their pay and expenses shall be distributed over the various maintenance accounts in the same manner as that of employees under their supervision. The repair accounts shall include the cost of direct supervision such as that of the foremen and subforemen while the cost of general maintenance supervision such as that of the general, divisional, and district plant superintendents shall be charged to account No. 601, "Supervision of maintenance" (Class C, account No. 670).

CASE 115.

Query. To what account should be charged the pay and expenses of troublemen engaged to some extent in traffic work?

Answer. The pay and expenses of troublemen shall be distributed to the several maintenance, traffic, or other accounts involved in their work. (*See Cases* 110 *and* 111.)

CASE 116.

Query. To what account should be charged the pay and expenses of wire chiefs?

Answer. The pay and expenses of wire chiefs shall be distributed to the several maintenance, traffic, or other accounts involved in their work. (*See Cases* 110 *and* 111.)

CASE 117.

Query. Must specific authorization be obtained from the Interstate Commerce Commission whenever it is desired to spread over a period large items of expense due to judgments, fires, accidents, strikes, etc.?

Answer. Such items may be spread over two or more months of a single calendar year without specific authority from the Commission.

If Class A and B companies desire to extend into the succeeding year charges provided for in section 24, page 68, of the Uniform System of Accounts, and if Class C companies desire to spread similar expense over succeeding years, special authorization must be obtained.

CASE 118.

Query. What should be the accounting for additional pay allowed employees for loyal service and overtime work during a strike?

Answer. Charge the accounts to which the regular pay of the employees is chargeable.

CASE 119.

Query. A company is required by a city ordinance to cut and replace overhead wires when it is necessary to move a building across or along the street. To what account shall such expense be charged?

Answer. Account No. 602, "Repairs of aerial plant" (Class C, account No. 600).

CASE 120.

Query. What should be the accounting for the expense of making changes at cable terminals on account of changing service from one-party to two-party lines, or vice versa, and on account of reassociation of party lines?

Answer. Charge account No. 602, "Repairs of aerial plant" (Class C, account No. 600) or account No. 605, "Repairs of station equipment" (Class C, account No. 610) according to the class of wire worked upon.

CASE 121.

Query. A franchise granted by a municipality requires that the company shall, when so required by the city engineer, change its pole line to conform to curb and grade lines established by the city. Should the cost of this work be charged to account No. 673, "Telephone franchise requirements?"

Answer. No. If substitution of new plant for existing plant is not involved, charge account No. 602, "Repairs of aerial plant" (Class C, No. 600), unless the expense is relatively large and provision therefor has been made in the depreciation reserve, in which case treat as "extraordinary repairs" (Class C, "reconstruction").

If substitution of new plant for existing plant is involved, the substitution not amounting to a practical replacement, treat as "extraordinary repairs" (Class C, "reconstruction"). Otherwise, treat through the plant accounts, i. e., credit the appropriate plant accounts with the cost of the property retired and charge the appropriate plant accounts with the cost of the new property.

CASE 122.

Query. What should be the accounting when, in connection with street or roadway improvements, a telephone company is required to move its pole line at its expense?

Answer. If substitution of new plant for existing plant is not involved, charge account No. 602, "Repairs of aerial plant" (Class C, No. 600), unless the expense is relatively large and provision therefor has been made in the depreciation reserve, in which case treat as "extraordinary repairs" (Class C, "reconstruction").

If substitution of new plant for existing plant is involved, the substitution not amounting to a practical replacement, treat as "extraordinary repairs" (Class C, "reconstruction"). Otherwise, treat through the plant accounts, i. e., credit the appropriate plant accounts with the cost of the property retired and charge the appropriate plant accounts with the cost of the new property.

CASE 123.

Query. To what account should be charged the expense of pole butt reinforcements to make good the deterioration of the pole?

Answer. Ordinarily, this work should be classed as ordinary repairs and the cost thereof charged to the primary repair accounts. However, if provision for such work has been made in the depreciation reserve, the work should be treated by Class A and B companies as "extraordinary repairs," and by Class C companies as "reconstruction."

CASE 124.

Query. What should be the accounting for the following items in connection with schools conducted by the company for the instruction of plant department employees?

(1) Equipment installed and used in such schools.
(2) Maintenance of above (if done independently of school work).
(3) Salaries of men during attendance.
(4) Salaries and expenses of instructors, materials consumed in connection with such work, rent, and house service, etc.

Answer. (1) Charge the fixed capital (or plant and equipment) accounts for the classes of plant involved.

(2) Charge the maintenance accounts for the classes of plant involved.

(3) Consider as nonproductive time and distribute over productive time of the men engaged on the kinds of work covered by the school; e. g., time of the men studying the work of an installer should be distributed over productive time of the installation force.

(4) Apportion, on an equitable percentage basis, to the accounts covering the several types of work covered by the school.

CASE 125.

Query. To what account should be charged the pay and expenses of students while engaged in learning the work of switchmen in automatic central offices?

Answer. Account No. 604, "Repairs of central office equipment" (Class C, account No. 610).

CASE 126.

Query. To what account should be charged the expense of temporarily disconnecting subscribers' lines in the central office for periods of nonuse or because of nonpayment of bills?

Answer. Account No. 604, "Repairs of central office equipment" (Class C, account No. 610).

CASE 127.

Query. To what account should be charged the wages of switchmen in automatic central offices?

Answer. Account No. 604, "Repairs of central office equipment" (Class C, account No. 610), except for time spent in operating the power plant, which should be charged account No. 628, "Transmission power" (Class C, account No. 660).

CASE 128.

Query. What should be the accounting when a component part of a station (not a complete station) is replaced; e. g., when occasionally a desk set or bell is substituted for one worn out or requiring repairs?

Answer. The substitution of a component part of a station set being a minor replacement as defined in section 21, page 66, of the Uniform System of Accounts (Class C, sec. 14, p. 12) the cost thereof shall be charged to account No. 605, "Repairs of station equipment" (Class C, account No. 610). The part removed shall be credited to account No. 605 (Class C, No. 610) at salvage value.

CASE 129.

Query. To what account should be charged repairs to rented buildings made by the accounting company?

Answer. Account No. 606, "Repairs of buildings and grounds" (Class C, account No. 640), unless the rent paid for the building is charged to one of the clearing accounts (Class A and B accounts Nos. 701 to 706), in which case the repairs should be charged to the same clearing account.

CASE 130.

Query. A plant employee is sent to disconnect a subscriber's station because of nonpayment for service. To what account should the expense be charged if the work of disconnecting is abandoned because of the payment of the bill?

Answer. Account No. 607, "Station removals and changes" (Class C, account No. 620).

CASE 131.

Query. Should the text of account No. 610, "Other maintenance expenses" (Class C, account No. 640) be interpreted as excluding expenses incurred by the plant department which are not in the nature of "repairs" to telephone plant and equipment?

Answer. No. Miscellaneous items of maintenance and operating expense incurred by the plant department which are not chargeable to maintenance accounts Nos. 601 to 609, inclusive, and clearing accounts Nos. 701 to 707, inclusive (Class C, accounts Nos. 600, 610, and 620), may be charged to account No. 610 (Class C, account No. 640). (*See Case* 111.)

CASE 132.

Query. When material fit to use again has been taken out of plant and charged to the materials and supplies accounts at the original cost, estimated if not known, or at the price of corresponding new material, what should be the accounting for repairing (not converting) such material?

Answer. Charge the expense of repairs made thereon to the repair accounts which would have been charged had the repairs been made while the material was in actual service. Only items involving expense due to causes defined as depreciation and so large as to distort the ordinary repair accounts shall be treated as "extraordinary repairs" by Class A and B companies (sec. 21, p. 66, of the Uniform System of Accounts) and as "reconstruction" by Class C companies (see sec. 12, p. 11, of the Uniform System of Accounts).

CASE 133.

Query. What should be the accounting for the expense of repairs to used office furniture and fixtures carried in the materials and supplies accounts?

Answer. (1) If the used furniture and fixtures had been charged to the materials and supplies account at salvage value, the cost of the repairs shall be charged to account No. 122, "Materials and supplies" (Class C, account No. 135).

(2) If the used furniture and fixtures had been charged to materials and supplies account at the original cost, or at the price of corresponding new material, the cost of repairs shall be charged to the expense accounts which would have been charged had the repairs been made while the furniture and fixtures were in actual service, except in cases where provision has been made for such expense in the depreciation reserve, Class A and B companies shall treat the matter as "extraordinary repairs" and Class C companies as "reconstruction" (see sec. 21, p. 66, of the Uniform System of Accounts for Class A and B companies and sec, 12, p. 11, for Class C companies). (*See Case* 52.)

CASE 134.

Query. What should be the accounting for the cost of repairs to connecting companies' and to farmers' lines when the work is done and the expense is borne by the accounting company?

Answer. Charge the appropriate repair accounts of the accounting company according to the class of plant worked upon.

CASE 135.

Query. To what account should be charged the expense of moving an employee from one location to another when transferred by the telephone company and the expense is assumed by it?

Answer. Charge the account to which traveling expenses of the employee in the new location would be charged.

CASE 136.

Query. To what account should be charged the cost of figuring rates and the expense of issuing tariff and route books?

Answer. The expense of figuring the rates and preparing the data shall be apportioned between account No. 621, "Traffic superintendence," and account No. 640, "Commercial administration," according to work performed (Class C, charge account No. 670).

The expense of printing and distributing shall be apportioned between account No. 629, "Central office stationery and printing," and account No. 640, "Commercial administration," on an equitable basis (Class C, accounts Nos. 660 and 680).

CASE 137.

Query. To what account should be charged the expenses incurred by the traffic inspectors in making test calls, adjusting service complaints, inspecting subscribers' private branch exchanges and instructing subscribers' private branch exchange operators?

Answer. Account No. 622, "Service inspection" (Class C, account No. 660). Cash refunded to patrons and amounts deposited in making test calls by inspectors and other employees of the company should not be charged to this account but should be charged to the revenue accounts.

CASE 138.

Query. To what account should be charged the expense incurred by the traffic department in reading meters installed on measured service lines?

Answer. Account No. 623, "Clerical operating wages" (Class C, account No. 660).

CASE 139.

Query. What should be the accounting for the pay of operators furnished lessees of private branch exchanges and for the amounts received for such services?

Answer. Charge the pay of the operators to account No. 624, "Operators' wages" (Class C, account No. 650).

If the operators are regularly employed by the telephone company, credit the payments from subscribers for the services of the operators to account No. 525, "Other miscellaneous revenues" (Class C, account No. 520). If the operators are not regularly employed by the telephone company, credit the reimbursement to account No. 624, "Operators' wages" (Class C, account No. 650).

CASE 140.

Query. To what account should be charged the pay and expenses of wire chiefs when working on Morse leased lines in central offices?

Answer. Charge the accounts otherwise charged with the pay and expenses of wire chiefs unless considerable time is involved, in which case charge account No. 624, "Operators' wages" (Class C, account No. 650).

CASE 141.

Query. When a telephone company operates a private-branch exchange for company (official) business, should any transfer be made from traffic expenses to the expense accounts of the departments served?

Answer. No. The cost of operating such private branch exchanges shall be charged to the various accounts under traffic expenses.

CASE 142.

Query. Should any portion of supply expense and plant supervision expense be applied on plant department charges to Class A and B, account No. 628, "Transmission power," and account No. 673, "Telephone franchise requirements?"

Answer. Yes. The appropriate portion of such expenses may be charged to account No. 628 and account No. 673 in the usual manner.

CASE 143.

Query. To what account should be charged amounts re-

funded to connecting companies for postage on toll tickets and reports forwarded?

Answer. Account No. 629, "Central office stationery and printing" (Class C, account No. 660).

CASE 144.

Query. To what account should be charged the cost (i. e., postage and other transportation charges) of forwarding toll tickets:

(1) From central offices to revenue accounting offices.

(2) From revenue accounting offices to local collection offices.

Answer. (1) Account No. 629, "Central office stationery and printing" (Class C, No. 660).

(2) Account No. 646, "Revenue accounting" (Class C, No. 680).

CASE 145.

Query. To what account should be charged the cost of covers, chains, and locks used in connection with directories at pay stations?

Answer. Account No. 632, "Pay station expenses" (Class C, account No. 660).

CASE 146.

Query. What is the general distinction between items of expense account of pay stations which are chargeable to account No. 632, "Pay station expenses" (Class C, account No. 660), and those which are chargeable to account No. 648, "Pay station commissions" (Class C, account No. 680)?

Answer. Account No. 632, "Pay station expenses" (Class C, No. 660) shall be charged only with the costs of *specific items* of traffic expense, such as are classable under that account. Items chargeable to this account usually occur in connection with pay stations which are attended by a company employee or by a joint employee, and should be stated as flat sums rather than as percentages on receipts.

Account No. 648, "Pay station commissions" (Class C, No. 680) shall be charged with all percentages of receipts, or flat amounts deducted from receipts, or other specified sums, which are paid either to the agent in charge (usually not a salaried employee of the company) or to the person, individual, corporation, or other, upon whose premises the public pay station is located, as *general compensation* for all that is furnished with respect to this station, i. e., space, light, heat, attendance, incidental advertising, etc.

When the classification is doubtful, the expense shall be charged to account No. 648, "Pay station commissions" (Class C, No. 680).

CASE 147.

Query. What should be the accounting for the cost of stationery and printing used by the commercial department?

Answer. This expense should be apportioned on the basis of use to the several accounts under "Commercial expenses" (Class C, account No. 680).

CASE 148.

Query. When a telephone company, instead of providing its own switchboard and switchboard operator, terminates its toll lines in the switchboard of another telephone company and arranges to have the latter do the necessary operating, what should be the accounting if the charges for such services are on a flat sum basis (not on a division of revenue)?

Answer. The company receiving the service shall charge account No. 633, "Other traffic expenses" (Class C, account No. 660).

If services are billed at cost, the company performing the service shall credit the appropriate operating or other accounts previously charged; if not billed at cost, it should credit account No. 525, "Other miscellaneous revenue" (Class C, account No. 520).

CASE 149.

Query. To what account should be charged (1) miscellaneous contributions, and (2) related expense, such as decorating buildings or furnishing floats on holiday occasions?

Answer. (1) If contributions are made for the purpose of developing traffic, for example, expenses incurred in connection with an industrial exposition or other business occasion, charge account No. 642, "Advertising" (Class C, account No. 680). If contributions are made without regard to traffic but incidentally for the benefit of the operations of the company, such as those to local fire departments, business leagues, Y. M. C. A., and similar institutions charge the appropriate expense account of the department concerned; or, if impossible of allocation, charge account No. 675, "Other general expenses" (Class C, account No. 680).

(2) Expenditures such as those for decorating buildings and furnishing floats on holiday occasions, except when incurred for traffic purposes and, therefore, chargeable to account No. 642, "Advertising" (Class C, account No. 680) should be departmentalized as far as possible. Items so general in character as not to admit of departmentalization should be charged to account No. 675, "Other general expenses" (Class C, account No. 680). (*See Case* 111.)

CASE 150.

Query. To what account should be charged the salaries and expenses of auditors of receipts and their clerks and division auditors of receipts and their clerks?

Answer. Account No. 646, "Revenue accounting" (Class C, account No. 670).

CASE 151.

Query. To what account should be charged the cost of postage used in mailing bills to subscribers?

Answer. Account No. 647, "Revenue collecting" (Class C, account No. 680).

CASE 152.

Query. To what account should be charged the cost of special editions of directories, or parts of directories, for use by the traffic department?

Answer. Account No. 649, "Directory expense" (Class C, account No. 680) or treat through account No. 132, "Prepaid directory expense" (Class C, account No. 145).

CASE 153.

Query. To what account should be credited amounts received from the sale of new directories or as salvage on old directories?

Answer. Credit receipts from sales of directories to account No. 523, "Advertising and directory" (Class C, account No. 520), and from salvage to account No. 649, "Directory expenses" (Class C, account No. 680).

CASE 154.

Query. To what account should be charged losses incurred by reason of shortage in a local manager's account in excess of the amount paid on his bond by the surety company?

Answer. Account No. 640., "Commercial administration" (Class C, account No. 680).

CASE 155.

Query. To what account should be charged the pay of a general manager or superintendent having supervision of the entire operations of the company?

Answer. Account No. 661, "Salaries of general officers" (Class C, account No. 670).

CASE 156.

Query. What account should be charged with the expense of a board of arbitrators on subscribers' rates?

Answer. Account No. 650, "Other commercial expenses" (Class C, account No. 680).

CASE 157.

Query. To what account shall be charged the expense of compiling data and making reports to the Federal Government, public-service commissions, tax authorities, and others, and of testifying before such bodies?

Answer. The expense shall be charged to the accounts otherwise charged with the pay and expenses of the employees who prepare the reports or testify before such bodies. For example, if the reports are prepared by the general office clerks, the expense of preparing should be charged to account No. 662, "Salaries of general office clerks" (Class C, account No. 670); if the data regarding plant are prepared by the plant forces, the expense should be charged to account No. 601, "Supervision of maintenance," or account No. 706, "Plant supervision expense" (Class C, account No. 640); if the passing of tax claims, filing tax reports, and making returns to tax assessors are handled by the legal department, the expense should be charged to account No. 667, "General law expenses" (Class C, account No. 670).

CASE 158.

Query. To what account should be charged allowances and expenses of receivers operating a telephone company under orders of the court?

Answer. Account No. 661, "Salaries of general officers" (Class C, No. 670), and account No. 663, "General office supplies and expenses" (Class C, account No. 680), except that expenses incurred for legal services shall be charged to account No. 667, "General law expenses" (Class C, account No. 680).

CASE 159.

Query. Is any accounting distinction to be made between monthly or other periodic payments to attorneys regularly retained by the company and those retained for specific services?

Answer. No. Both the periodic payments to attorneys regularly retained by the company and the payments to and expenses of attorneys retained for specific services shall be charged to account No. 667, "General law expenses," or account No. 670, "Law expenses connected with damages," as may be appropriate (Class C, account No. 680).

CASE 160.

Query. A company elects to protect itself against all losses ordinarily covered by premium insurance, by setting up a reserve for that purpose, but, in order to obtain additional protection, a part or all of the risk is placed with an insurance company. What should be the accounting for the premiums paid to and the recoveries received from the insurance company?

Answer. The amounts set aside as an insurance reserve shall be charged to account No. 668, "Insurance" (Class C, account No. 680), and credited to account No. 169, "Insurance and casualty reserves" (Class C, account No. 190). Premiums paid insurance companies for such reinsurance shall be charged to account No. 169 (Class C, account No. 190) and recoveries from such companies shall be credited to account No. 169 (Class C, account No. 190).

CASE 161.

Query. What should be the accounting for insurance premiums on materials and supplies carried in stock?

Answer. Charge account No. 668, "Insurance" (Class C, account No. 680), with the premiums paid and periodically transfer the portion applicable to construction to the appropriate fixed capital (plant and equipment) accounts or charge to account No. 274, "Miscellaneous construction expenditures" (Class C, account No. 270).

CASE 162.

Query. To what account should be charged the cost of insuring of the continuity or regularity of revenues or earnings, i. e., "use-and-occupancy insurance"?

Answer. Account No. 668, "Insurance" (Class C, account No. 680).

CASE 163.

Query. To what account should be charged the premium paid on a judicial bond necessary in connection with the appeal of a personal-injury or damage case?

Answer. Account No. 670, "Law expenses connected with damages" (Class C, account No. 680).

CASE 164.

Query. To what account should be charged the premiums on bonds given as follows:

(1) To municipalities under the general terms of a franchise or ordinance and not in connection with specific construction or maintenance work.

(2) To municipalities or property owners in connection with specific pieces of construction or maintenance work.

Answer. (1) Account No. 673, "Telephone franchise requirements" (Class C, account No. 680).

(2) The appropriate construction or maintenance accounts according to the nature of the work.

CASE 165.

Query. To what account should be charged the expense of publishing a company newspaper or other journal?

Answer. Account No. 675, "Other general expenses" (Class C, account No. 680), unless published in the interest of a specific department, in which case charge the operating expense account pertaining to that department. Receipts from subscriptions and from the sale of advertising space in such journals shall be credited account No. 675 (Class C, No. 680) or the other account to which the cost of publishing was charged.

CASE 166.

Query. May the cost of patents be charged by Class A and B companies direct to account No. 674, "Amortization of franchises and patents," instead of to account No. 203, "Patent rights," and amortized through charges to account No. 674?

Answer. Charges to account No. 674, "Amortization of franchises and patents," on account of patents should be restricted to amounts necessary to cover such portion of the life of patents charged to account No. 203, "Patent rights," as it is estimated has expired or been consumed.

The character of a patent purchased should determine whether or not the cost, or any portion thereof, should be charged to account No. 203, "Patent rights." Any amounts paid for patents having an estimated service life of less than one year, patents of doubtful service value, patents in an undeveloped state, patents acquired at small cost, and similar expenditures on account of patents may be charged direct to account No. 675, "Other general expenses."

CASE 167.

Query. To what account should be charged the cost of a general audit of a company's books by an audit company?

Answer. Account No. 675, "Other general expenses" (Class C, account No. 680).

CASE 168.

Query. To what account should be charged the cost of printing franks for the use of officers and employees of the company?

Answer. Account No. 675, "Other general expenses" (Class C, account No. 680).

CASE 169.

Query. A pay check fell into the hands of an unauthorized party, who secured payment by use of a forged signature. The company was unable to effect collection from the bank paying the check, or from the person forging the same. To what account should the loss be charged?

Answer. Account No. 675, "Other general expenses" (Class C, account No. 680).

CASE 170.

Query. An agent of the company received a summons garnisheeing the wages of an employee. On account of delay incident to notifying the legal department, the employee succeeded in drawing his pay and the company was obliged to make good the amount of the claim. To what account should the loss be charged?

Answer. Charge the appropriate account of the department responsible for the delay.

CASE 171.

Query. To what account should be charged the cost of first-aid kits and renewals of same?

Answer. When such expense is incurred primarily for the plant department, charge account No. 706, "Plant supervision expense"; otherwise, charge the appropriate expense accounts of the departments in whose interests the costs are incurred.

CASE 172.

Query. To what account should be charged the cost of inventories and appraisals of plant?

Answer. Inventories and appraisals should be treated in the accounts as follows:

(1) Those taken incident to the ascertainment of a general valuation of the property owned or used by the company, including those taken in accordance with the Act to regulate commerce, or with other similar Federal or State requirements; charge to account No. 675, "Other general expenses," preferably in a subaccount entitled "Valuation expenses" (Class C, account No. 680). This ruling does not modify the provisions relating to betterments contained in section 9, page 32, of the Uniform System of Accounts for Class A and Class B Companies.

(2) Those taken on the orders of public authorities for other purposes such as for use in rate cases, or for the purpose of adjusting rate schedules; charge the cost to account No. 675, "Other general expenses" (Class C, account No. 680).

(3) Those taken in connection with the projected purchase of property; charge account No. 136, "Other suspense" (Class C, account No. 150), pending their final disposition. If the property is finally purchased, the cost should be considered as part of the price paid and charged to the appropriate asset account. If the property is not purchased, the cost shall be charged to account No. 417, "Other deductions from surplus" (Class C, account No. 195).

(4) Those taken in connection with the projected sale or lease of property to others; charge account No. 136 (Class C, No. 150), pending their final disposition. If the property is finally leased, charge the account appropriate for rent. If the property is sold and the selling price includes the cost of appraisal, such cost shall be considered a part of the sale price. If the project is finally abandoned, or if the property is sold, but the selling cost does not include the cost of appraisal, the cost of appraisal shall be charged to account No. 417 (Class C, No. 195).

No amounts shall be included in the cost of inventories and appraisals for incidental services of officers and employees; but special office, clerical, traveling, and incidental expenses incurred by such officers and employees may be included.

CASE 173.

Query. What should be the accounting for expenses incurred by the plant department in inspecting for and in checking the attachments of other companies to the pole lines of the accounting company?

Answer. Charge account No. 610, "Other maintenance expenses" (Class C, account No. 640), or if performed incident to other work, charge the accounts otherwise charged with the pay and expenses of the employees who perform the services.

CASE 174.

Query. To what account should be charged expenses on account of associations maintained by and in behalf of telephone companies?

Answer. The salaries and expenses of the officers representing the company as members of the associations shall be charged to the accounts to which the salaries and expenses of such officers are chargeable in connection with the operation of the telephone plant. Amounts paid incident to the maintenance of such asso-

ciations shall be charged to account No. 675, "Other general expenses" (Class C, account No. 680).

CASE 175.

Query. What should be the accounting for the expense of overhauling and repairing of motor trucks and like equipment?

Answer. The customary annual overhauling of such apparatus shall be charged to account No. 702, "Stable and garage expense," and cleared as provided in the text of that account. Work of less frequent occurrence or involving such reconstruction items as replacing the engine may be handled as "extraordinary repairs," if the reserve has been provided for such expenses. Class C companies shall charge this expense to account No. 640, "Other maintenance expenses."

CASE 176.

Query. To what account should be charged rent of land used for storage of material for use in construction and maintenance work?

Answer. Account No. 704, "Supply expense," and cleared as provided in the text of that account. Class C companies shall distribute on an equitable basis between account No. 640, "Other maintenance expenses," and account No. 270, "Undistributed construction expenditures."

The Telephone Builds a Bridge

The New York, New Haven and Hartford Railroad is planning to enter New York City by way of Long Island City and the Pennsylvania Railroad tunnels. To achieve this result necessitated a structure miles long that winds around on stone piers all the way from upper New York to Ward's Island, then over Hell Gate to Long Island, across which it goes to meet the Pennsylvania Railroad.

The greatest problem that confronted the engineers was the bridging of treacherous Hell Gate, as that part of the East River between Ward's and Long Island is called. A mastodonic arch of steel, designed to carry on its four tracks the heaviest weight ever carried by a similar structure was designed to meet the contingency. The work was started last January and in October of this year the steel arms that have been insistently creeping over the river from shore to shore were joined with the aid of a telephone system that in itself was a fitting climax to the greatest engineering feat the world has ever seen. From the day the concrete piers, one of each resting on opposite sides of the river, were completed telephones governed the driving of every rivet, the hoisting of every beam and the final junction of the completed arms in midair.

The arms started with four gigantic steel shoes, two of which were fastened on each of the concrete piers. On these shoes the first girders were hinged in a saddle-like arrangement that allows for contraction and expansion in the steel occasioned by climatic conditions. As bit by bit the girders took the form of the ultimate arch, a steel falsework reared itself perpendicularly on each of the concrete piers. On the tops of these steel columns four gigantic hydraulic jacks were placed—two for each column. Connected to each jack were eye beams, to which in turn were connected girders that stretched themselves land and river-ward. The girders that stretched over the river were fastened to that part of the arch that was completed, while those girders that stretched themselves landward formed a balancing arm. Thus a balance was struck and maintained, without which the weight of the steel arms would have tilted the concrete arches and precipitated the entire steel mass into the river. The hydraulic jacks under the eye beams served as hoists. By a twist of the wrist these jacks would lower or raise the steel arms by virtue of their sheer force of 4,800,000 pounds' pressure and the balancing action of the arms that stretched over the islands with a weight kept equal to the weight of the steel arms connected to the other end of the eye beams. As the traveling erectors slowly crept out over the river, putting girder after girder in place, these jacks kept pace by lifting the arms inch by inch. The movements of the jack attendants, as were the movements of every man on the job, were controlled by a telephone system as clever as it was simple. Standard Western Electric telephones were located in the power houses, the offices, in the erector cabins, at the jacks, at the compressor house and on the structure in close proximity to the boss riveters. All the stations on the Ward's Island side were connected to one line and all the stations on the Long Island side to another. A central telephone was put in on either side wanted to communicate to any station on run from there to Ward's Island. When any station the opposite shore, they could do so by signaling the the Long Island power house and a submarine cable Long Island power house, where the engineer in charge by the use of a special key could make the desired connection. All the telephones were thrown across their respective lines and any station called from any other by code signal. The system operated perfectly and so expedited the work that it was not necessary for the chief engineer to leave his desk to receive or deliver orders.

The climax of the work of the telephone came on the day when both arms were completed and were ready to be lowered into alignment. The completed arms hung in midair exactly 22½ inches out of alignment. The traveling erectors had been shoved out to the last eighth of an inch, another shove and they would have tipped over the whole business, and a year's work, to say nothing of some $12,000,000 in steel and countless human lives, would have been dashed into the river. It was necessary that the erectors be out to the last possible inch on the arms so that the riveters and the bridgemen would have something to work on and with when they fastened in the last girder, welding the arms together in one indissoluble link of steel. There could be no hit and miss work, and nothing left to chance, for if one side went too fast and the other side jammed, or the weight of one arm rested on the other unevenly, everything would have gone to the river bottom.

Gauges were affixed to the sides of the final beams marked off to the thirty-second of an inch, and at the exact spot the foreman stood with the telephone attached to a girder directly in front of him and with every station cut in and open. His was a ticklish job, for on him everything rested. He knew that the Ward's Island arm had to be lowered twelve inches and the Long Island side fourteen inches, which meant that while one arm traveled one inch the other would have to go seven-eighths of an inch. Next to the foreman in responsibility came the men who operated the jacks, for a twist too much to the valve that admitted the water to the pumps would spell disaster. Every man knew his job and every man repeated back his telephonic order. It was a gigantic and responsible task to put up to the telephone, but the telephone that carries the spoken word over hills, through valleys and under rivers from the Atlantic to the Pacific no less faultlessly carried the orders of the foreman over steel girders and under the East River to the men who stood at the pumps, the erectors and the riveting machines.

In this steel arch stretching 1,017 feet from support to support, the United States has not only the largest arch in the world, but has accomplished the greatest engineering feat of its kind ever known, and the telephone helped do it.

Of Interest to the Trade

What the Telephone and Accessory Manufacturers Are Doing to Advance the Art

To Specialize in Telephone Advertising

An announcement of considerable importance to telephone manufacturers comes this month in the way of a statement that the well-known advertising firm of Mock & Hardy intends to specialize largely in the telephone field.

This concern, which has been handling general advertising for some time, feels that there is great need for their services in the handling of advertising for telephone manufacturers.

An industry which ranks fifth in the list of industries of the United States is by all odds the most poorly advertised. In spite of the tremendous field for their equipment, manufacturers continually complain that it is difficult to secure results by means of advertising.

Such complaint is not so frequently heard in other lines because more attention is paid to the subject of advertising—more care is exercised in the preparation of advertising copy.

Advertising is a business just the same as any other line of endeavor. And those who have specialized in advertising are able to turn out advertising that will get better results than those who have studied the subject but slightly. Ordinarily a manufacturer would not expect a factory man to go out on the road and sell goods for him, because that is not the factory man's business. Yet oftimes he is willing to entrust his advertising to equally unskilled handling—and then he wonders why results are not forthcoming.

The members of the firm of Mock & Hardy have a number of notable advertising successes to their credit, some of which are in the telephone field. Thus they have proved to their own satisfaction as well as to that of their clients that advertising results can be secured for manufacturers of telephone equipment and supplies. Their method of working is rather unique in that they operate on a salary and take full charge of the advertising affairs of a concern—exactly as a high-grade advertising manager would do. By handling the advertising of a number of concerns on a part-time basis, they are thus able to render to each concern a high-grade advertising service at the very minimum of cost.

The offices of Mock & Hardy are located in the Harris Trust Building, 111 West Monroe street, Chicago. A letter directed as above will receive personal attention and will bring back full information regarding the services this concern is able to render to telephone manufacturers.

Fine Catalog Issued by Frank B. Cook

Telephone men who have grown accustomed to depend upon Cook's "Little Brown Book" for their information regarding telephone protection will be interested in learning that a new Cook catalog has just been issued.

The new catalog is also brown in color, although it is a little larger, considerably handsomer, and much more convenient to use. The illustrations are large and unusually distinct, so a very good understanding can be had of the various pieces of Cook equipment merely by examining the illustrations.

Although referred to as a catalog, this book, which has been some months in preparation, is really a compendium of information on the subject of telephone protection. Because of this it is an unusually valuable addition to the telephone library because comparatively little has ever been written on this subject.

The various units of the Cook line are illustrated and described, and in addition the book contains general articles on "The Importance of Telephone Protection," "Central Office Protection," "Sub-Station Protectors," "Lightning Arresters," "Accurate Telephone Testing," "Fuses," "Pole Cable Terminals," etc.

Frank B. Cook's New Catalog.

Several new pieces of equipment have been added to the Cook line, among them three new central office protectors, several sub-station protectors, a new lightning arrester, etc., all of which are illustrated and described in the new catalog.

A copy of this book will gladly be sent post-paid simply by addressing the Frank B. Cook Company, 326 West Madison street, Chicago.

Telephones from Aeroplane

American military aviators expressed gratification over the achievement of Captain Clarence Culver of the signal corps aviation school at San Diego, Cal., in sending radio telephone messages from an aeroplane at ten-minute intervals during a flight to Santa Monica and return. The distance covered was about 230 miles.

Telephone in Government First Aid Exhibit

At various expositions and world's fairs that have been held in the United States the Federal Government's activities along the lines of life saving and property saving have been explained to those who were fortunate enough to attend those great educational affairs. Persons who have visited the nation's Capitol also have had opportunity to know what the government is doing in these lines; but the great majority have little knowledge of the vast organization effected to protect the people in peace as well as in war.

In view of the fact that so many people of the United States could not go to the various exhibits of their government's activities the government decided to bring the exhibit to the people. Accordingly a "Safety First Special" was conceived and carried out. The Baltimore & Ohio Railroad offered the government the free use of a complete all-steel train to transport the exhibit. In this train there are nine coaches and one baggage car for the exhibit and a sleeping and dining car for the officers and employes of the government.

The interiors of the cars are arranged by the various departments of the government that make displays, embracing the Treasury Department, War Department, Department of the Interior, Department of Agriculture, Interstate Commerce Commission and American Red Cross Society.

The Forest Service Telephone.

One of the most interesting exhibits is that of the Forest Service Division of the Department of Agriculture.

This exhibit is designed to bring out the features of service work which have to do specifically with the conservation of life and property, namely, forest fire prevention and watershed protection.

An interesting part of this exhibit is that devoted to showing the role the telephone plays in the Government Forest Service. Included in the telephone equipment is a forest telephone set complete with weatherproof iron case and howler. The latter is used instead of bells, to summon the rangers from far and near, and consists of a vibrating diaphragm actuated by an interrupted current. The vibrations are intensified by means of a short megaphone and emit a piercing shrill whistle that carries great distances. There is also on exhibition the new forest service hand set. This set is all-inclusive, containing battery and signaling apparatus and together with the ground rod that accompanies it may be used no matter how far the ranger may be from a telephone station, provided, of course, he has access to a telephone line. The above apparatus is of Western Electric manufacture and is standard stock.

The Forest Service Hand Set.

To the uninitiated and the layman the part that the telephone plays in the Government Forest Service is both enlightening and interesting. It is further evidence of the ever increasing use of the telephone.

Middletown Company Celebrates Growth

In June the subscriber list of the Middletown Telephone Company of Middletown, Ohio, reached the 3,000 mark and in celebration of its unprecedented growth the company gave a banquet to its employes and company directors, the local newspaper men and a number of special guests. Covers were set for 60 people and each guest was provided with a souvenir desk stand and a napkin imprinted with the order of the day and a reproduction of the conventional telephone.

President Bundy of the company called the diners to their seats by ringing a bell that was placed beneath a standard Western Electric desk stand mounted in the center of the table. Called to their places the diners placed upon their heads red, white and blue paper caps and sang patriotic airs before "falling to."

After dinner Director Palmer acted as toastmas-

ter and under his direction several short speeches were delivered. Mr. Palmer then introduced the famous Western Electric manikin that supplied a half hour's pleasant entertainment. This manikin has traveled throughout the country and has amused and entertained thousands of people in all the principal cities. Consisting of a loud speaking receiver concealed in a dummy that moves its arms, head and mouth at someone else's will, and a transmitter, it permits of a ventriloquistic entertainment that is realistic and amusing.

At the conclusion of the entertainment the party repaired to a local theater where they spent the remainder of the evening. The celebration was voted a success and served as a fitting commemoration of a worth while attainment.

Kellogg Bulletin on Magneto Switchboard

A new 40-page bulletin on magneto switchboards has just been issued by the Kellogg Switchboard & Supply Company, Chicago. This bulletin covers the

MAGNETO SWITCHBOARDS
BULLETIN No. 90
COPYRIGHT MAY, 1916
Kellogg Low Key Shelf Switchboards
Kellogg Switchboard & Supply Company
KANSAS CITY, MO. CHICAGO, ILL. SAN FRANCISCO, CALIF.
MANUFACTURERS OF STANDARD TELEPHONE EQUIPMENT

new low keyshelf boards and is of interest to every telephone man who is either contemplating new central office equipment, or merely interested in the development of better switchboard apparatus.

The bulletin is handsomely illustrated with halftones of cabinets and apparatus. The diagrammatic cabinet drawings, face and rear equipment sketches and circuits make it easy for the prospective purchaser to plan intelligently for new central office equipment. The clear and comprehensive descriptions assist in making these drawings more valuable.

The Kellogg company invites every telephone man who is interested to write for bulletin No. 90.

An easy way to get a reputation for wisdom is to tell a man he is wrong when he starts to knock himself.

Canadian Kodak Takes Stromberg Equipment

The Canadian Kodak Company of Toronto, which is to Canada what the Eastman Kodak Company is to the United States, has contracted with the Stromberg-Carlson Telephone Manufacturing Company for the installation of a new common battery private branch exchange equipment for its Toronto plant.

The switchboard consists of a standard unit type lamp signal multiple switchboard section, having a multiple jack capacity for 600 lines. The cord circuits are arranged with double lamp supervisory signals and ring back keys. The contract also calls for main distributing frame, relay rack, power and battery equipment and sub sets for the complete installation of the plant.

It is pretty generally admitted in the telephone and electrical trade that the purchasing specifications of the kodak company are about as rigid as can be drawn and it speaks well for the Stromberg-Carlson equipment to have been selected to supply the installation.

Cleveland Lists Indianapolis Stock

Secretary W. S. Wade of the Cleveland Stock Exchange has announced that the exchange has listed common and preferred stocks of the Indianapolis Telephone Company, the Independent closely allied with the Ohio State. The Indiana company has $4,000,000 common stock and the same amount of preferred authorized, of which $1,150,000 common and $1,900,000 preferred are outstanding. The preferred pays 6 per cent cumulative to Jan. 1, 1918, and 7 per cent cumulative thereafter. The market for the preferred is now in the 90 neighborhood, while the common would bring 28 or 29.

These stocks were offered to holders of Ohio State common and preferred when originally put out earlier this year. The sale to holders of Ohio State was on the basis of three shares of Indianapolis common as a bonus, with ten Indianapolis preferred at par. Net profit has been available to Ohio State holders, who sold their Indianapolis, but the present market means about $987 for the $1,000. Predictions are made that the market must advance.

"The Telegraph in Selling" is the title of a collection of testimonials and comments on telegraph service issued by the Western Union Telegraph Company. Similar compilations relating to the long distance telephone would be valuable.

Bulletin No. 250 of the Leeds & Northrup Company, Philadelphia, illustrates and describes the Type R galvanometer, an inexpensive galvanometer of high sensitivity.

The Lackawanna Mills of the Scranton Button Company gave its nineteenth annual outing to its employes at Lake Lodore, Pennsylvania, Saturday, August 19, which event was thoroughly enjoyed.

The Frankel Connector Company's booklet of solderless electrical connectors, testing clips, spark plugs, etc., is a good thing to have around the exchange.

Merger Disputes in West Virginia

The Wheeling, W. Va., Board of Trade at a special meeting decided to resist with every available resource any increase in telephone rates following the proposed consolidation of the Consolidated Telephone Company of West Virginia, Chesapeake & Potomac Telephone Company, Central District Telephone Company and the Chesapeake & Potomac Telephone Company of New York.

It was decided to have a representative before the state public service commission when the matter comes before that body September 12. The schedule of the proposed rates filed recently shows that it will cost ten cents for a Moundsville subscriber to talk to Wheeling and a like sum for a Wheeling party to talk to Moundsville.

Chicago Stockholder Loses Suit

Otto Cullman of Chicago, a stockholder of the Chicago Telephone Company, failed in his effort to restrain the company from paying $2,532,000 for the automatic telephone system of the Chicago Tunnel Company.

The petition for a restraining order, filed by Attorney Fayette S. Monroe, on behalf of Cullman, came to a hearing before Judge Landis.

Cullman asserted that the payment would enable the American Telephone and Telegraph Company to take another step toward a monopoly of all telephone business in the United States.

Judge Landis denied the petition on the ground that the Supreme Court had ruled that no stockholder who had purchased his stock since the transaction took place could raise bona fide objection.

Cumberland Valley Demonstrates Automatic

Just how the automatic telephone—the new system to be installed by the Cumberland Valley Telephone Company—does its work is being demonstrated in Harrisburg by a public exhibit of the automatic system held in the old Cook department store at 308 Market street.

The vacant store room has been fitted up as an "exchange" with switchboard and all the other equipment—except the headharnessed girls found in the usual manual exchange.

Representatives of the telephone company will show how the work ordinarily done by feminine fingers, brain and voice is taken care of by the perforated dial.

No More "Neighbors' Telephones"

In Pennsylvania the Bell Telephone Company has discontinued the privilege of securing telephone numbers nearest to homes where there is no telephone, so that the parties can be called. It is believed that persons who were asked to get "so and so to the telephone" made complaints.

Cumberland Valley Buys Middletown

Sale of the Middletown Telephone Company stock and bonds to the Cumberland Valley Telephone Company was authorized at Harrisburg, Pa., at a special meeting of the stockholders of the former company. Authorization of the purchase by the Cumberland was given by the directors of that company.

Independents Appeal Against Central Union

Announcement was made at Paris, Ill., by Attorney F. T. O'Hair that his clients, the Independent telephone companies of Illinois, Indiana and Ohio, including the Citizens' Company of Terre Haute and the Wabash Valley Company of Paris, have appealed their case against the Central Union Telephone Company to the department of justice at Washington.

If the Independent companies are successful in their action it will be possible for all their patrons to talk to subscribers of the Bell lines, and vice versa.

The controversy originated before the board of public utilities of Illinois when the Central Union Company asked for the board's consent to a merger of its 450,000 telephone system in Chicago with the 30,000 telephone system of the Automatic Company. The Independents consented to the merger, provided the Central Union agreed to Chicago connections with Independent lines. The utility commission denied this concession and gave consent to the merger.

Now the Independents have appealed to the department of justice, asserting that the proposed merger is a direct violation of a written agreement the Central Union has with the federal government.

Chicago Telephone Report

The report of the Chicago Telephone Company for July shows an increase in the number of company stations of 10.2 per cent, as compared with the corresponding month in 1915 and an increase in operating income of 6.78 per cent. The principal items of the report compare:

	July, 1916	*Increase*
Number of company stations at end of month	534,199	49,472
Telephone operating revenue	$1,610,755	153,633
Telephone operating expenses	1,179,615	126,557
Net telephone operating revenue	431,140	27,076
Uncollectible operating revenue taxes assignable to operations	90,938	5,474
Operating income	340,201	21,601
Increase in capital items	632,396	499,020

Michigan State's Traffic Magazine

The *Michigan Belle* is the name of a magazine devoted to the interests of the traffic department of the Michigan State Telephone Company, of Detroit, the first number of which has appeared. The magazine is to be published monthly. Mrs. Mina Humphrey Varnum is the editor and she is assisted by representatives at the various exchanges. The first number contains several departments of the news written with the view of interesting the hundreds of operators in Detroit, and is very attractive in form and make-up.

Wisconsin Suit Settled

The suit of the State of Wisconsin against the Door County Telephone Company of Sturgeon Bay for a penalty of $150,000 for neglect to comply with an order of the State Railway Commission requiring the company to improve its service, was compromised by the payment of the minimum penalty of $700 by the company to the state.

Pacific Bell Gets Franchise

The ordinance which grants the Pacific Telephone & Telegraph Company a franchise to carry on a telephone business in Vallejo, Cal., for the next quarter of a century has been finally adopted by the city council and becomes effective in sixty days. The municipality will receive twenty free telephones.

Brevities of the Business

The Activities of the Whole Telephone Field Told in Short Paragraphs

PERSONAL NOTES.

H. D. Gurley, who has occupied the position of cashier for the Southern Bell Telephone & Telegraph Company at Charlotte, N. C., for the past four years, has been transferred to Spartanburg as manager. This is a distinct position for Mr. Gurley, who has a record of twelve years' continuous employment in the Bell Telephone system.

F. O. Hale, chief engineer of the Southwestern Bell Telephone system, has been promoted to general manager of the Southwestern Telegraph & Telephone Company at St. Louis, Missouri, succeeding W. J. Hiss, recently resigned.

I. M. Sorlie of Grand Forks, has taken charge of the management of the Jamestown exchange of the Northwestern Telephone Company, North Dakota, during the absence of H. H. Hamilton, who is in service with the North Dakota state guard.

C. J. Larsen resigned August 1 as service engineer to the Eastern Pennsylvania Independent Telephone Association and is now associated with the Kansas City Telephone Company in the capacity of equipment and transmission engineer.

William F. Fidler, inspector for the Bucyrus Telephone Company, Ohio, for the past six years, has resigned and is now in the electrical department of the American Clay Company.

Leslie DeLong, plant chief of the Missoula exchange for the Mountain States Telephone & Telegraph Company, Montana, has been promoted to manager of the Anaconda exchange.

J. Corwin, cableman for the Bucyrus Telephone Company, Ohio, has resigned and is now connected with the American Clay Company.

J. W. Taylor, manager of the Syracuse exchange of the Lincoln Telephone & Telegraph Company, Nebraska, has been promoted to College View as manager. He is succeeded by Charles Dickeman, Talmage.

J. F. Henderson, for several years commercial superintendent of the Southwestern Telegraph & Telephone Company for the Northwest Texas division, has been appointed commercial superintendent for the entire state with headquarters at Fort Worth.

On account of ill health, W. D. Seckler has resigned as manager of the Altoona, Pa., exchange of the United Telephone & Telegraph Company, which position he assumed on April 1.

W. J. Hiss, for the past four years general manager of the Southwestern Telegraph & Telephone Company at St. Louis, Missouri, has resigned and is now with the American Telephone & Telegraph Company with headquarters in New York.

S. J. Hewlett has been appointed manager of the Bonham Telephone Company, Texas.

Thomas Brown, for the past three years district manager of the Bell Telephone Company at Kankakee, Illinois, has been promoted to Rock Island as district manager.

NOTES FROM THE FIELD.

ARIZONA.

The telephone company has just distributed a new directory in Douglas.

ARKANSAS.

The South Arkansas Telephone Company of Warren has filed articles of incorporation. Corporators were: H. Thame, D. A. Gates, W. J. Savage and W. J. Camp. The capital stock is $15,000, of which $8,000 has been paid.

Members of the county Farmers' Union in the vicinity of Union Hill, south of Batesville, are preparing to build a union telephone system between Union Hill and Pleasant Plains.

CALIFORNIA.

Plans are out for the new telephone building which is to be erected in Sanger on North N street. The building will be one story in height, and will be arranged especially for the use of the telephone company, which has entirely outgrown its present quarters.

In Coronado Beach a $6,000 substation of concrete and hollow tile will be built for the Pacific Telephone and Telegraph Company, at Eighth and Orange streets.

The Pacific Telephone and Telegraph Company paid into the city treasury of San Diego, as per the terms of its franchise, $6,586.28, being 2 per cent of the gross earnings of the company for the year ending August 7. This is the highest amount the company has paid to the city since it began business here, according to Manager J. E. Franklin.

The Home Telephone Company in San Diego at its annual meeting elected the following board of directors: Horace B. Day, R. E. Thompson, L. E. Dadmun, C. L. Williams and Arthur Cosgrove. At the meeting of the directors which was held immediately afterwards, the following officers were elected: President and treasurer, Horace B. Day; vice president and general manager, R. E. Thompson; secretary, E. R. Thompson.

CANADA.

The Bell Telephone Company, Clinton, Ont., are contemplating the installation of a new switchboard and placing the wires on Main street underground.

The Raymond Telephone Company, Limited, have been granted a charter.

The Rockwood & Oustic Telephone Company, Limited, have been granted a charter.

GEORGIA.

Because of the steady increase in business in Waycross the Southern Bell Telephone Company is having a survey made with the view of spending within the next six months or year between $8,000 and $10,000 extending cable service.

ILLINOIS.

It has been announced that E. W. Bates, C. E. Gullet and F. W. Longan, representing themselves and other stockholders in the Central Illinois Telephone and Telegraph Company, of Lincoln, have purchased a controlling interest in the New Holland telephone exchange.

INDIANA.

The Central Union Telephone Company has started tearing out the old Delaware and Madison County Company lines and poles and the installation of new equipment will follow. G. V. Post, of Muncie, has charge of the work.

The Commercial Telephone Company, at its meeting held August 22, decided to build an entire new front on the building it occupies on Center street, Warsaw. The following officers were also elected: Directors—Simon J. Strauss, John D. Widaman, Allan S. Widaman, Isaac D. Straus, Odel Oldfather, Joseph S. Baker, J. W. Scott. Officers—President, Simon J. Strauss; vice president, John D. Widaman; secretary, Joseph S. Baker; treasurer, J. W. Scott.

IOWA.

The Iowa Telephone Company has started the preliminary work on its new underground system in Carroll.

The Farmers and Merchants Telephone Company, which has maintained their headquarters at Hawarden the past few years, will make its headquarters at Storm Lake.

The Lanesboro Telephone Company is contemplating the erection of a new building to serve as a home central.

The Interior Telephone Company of Grinnell has installed twenty-five telephones in the high school building.

The Lamoni Telephone Company has issued a new directory.

Arrangements have been made by the Iowa Telephone Company for improvements at its Drake Park exchange, Des Moines, to cost about $50,000. Two additions, an extension at the rear and a second story will be made to the present structure. Work is expected to start at once.

KANSAS.

The Missouri and Kansas Telephone Company will install a switchboard in the Wichita Board of Trade.

On September 1 work will be started on a new telephone system in Liberal, costing $20,000.

The Missouri and Kanses Telephone Company intends to erect on East avenue a new building to house its central office equipment in Lyons, the complete improvements to cost sev-

eral thousand dollars. The building will be a one-story residence type of building, finished in half timber and stucco, 28 feet wide by 58 feet long.

KENTUCKY.

Maysville Telephone Company increased capital from $5,000 to $50,000.

The Lenox Telephone Company, Lenox, capital $870. Incorporators: Harlan McClain, W. T. Caskey and Ellis Caskey.

MICHIGAN.

The Michigan State Telephone Company, through J. H. Schmidt, of the Hannan Real Estate Exchange, has leased half the third floor of the Kresge building in Detroit in which to extend its auditing department.

The Holton Telephone Company has just been moved to its new office building and work is now rapidly going forward in the installation of new equipment and poles for lines to all parts of this district.

To meet the unusually heavy demand that is being made on the Michigan State Telephone Company for long distance service between Detroit and other industrial centers of the state, the telephone company has entered upon the construction of additional toll lines which will represent an increased investment of more than $400,000 in its plant department.

MONTANA.

The Four Valleys Telephone Company decided at a meeting of the stockholders held in Glasgow to construct a telephone line as far north as Opheim and possibly to Glentana.

A telephone line will be built from Brown's ferry to Cable. The work is in charge of R. E. Delaney.

Sioux Pass Farmers' Exchange to build a telephone line between Sioux Pass and Fairview, in Richard County. Capital $9,575, of which $1,575 has been subscribed. Incorporators, Christ S. Johnson, Carl Hunter, Olius Running, C. L. Teisinger and R. J. Anderson.

Lame Jones Telephone Company of Plevna, Fallon County, to build from Plevna to Ekalaka via Lame Jones. Incorporators, John Oliver, W. H. Peck of Ekalaka, Frank Stout and R. E. Lambert of Calumet and V. S. Himsl of Plevna. Capital, $5,000; $1.175 subscribed.

A large crew of telephone line and repair men are working in the vicinity of Dillon, repairing and overhauling the transmission line and placing new poles wherever necessary.

MISSOURI.

Plans for the construction of an additional circuit between Springfield and Mountain Grove at a cost of about $15,000 are being made by the Missouri and Kansas Telephone Company as a part of the general improvements being made in the long distance service in the southern division of the company. A line costing approximately $15,000 is in the course of construction between Springfield and Richland. A third improvement on the division planned by the company is a copper circuit between Monett and Neosho, a distance of about 30 miles. The cost of this line will be about $6,000.

NEBRASKA.

The directors of the Blair Telephone Company have called a special meeting of the stockholders August 21 for the purpose of considering the purchase of a new switchboard.

The Lincoln Telephone and Telegraph Company have completed the canvass of its subscribers and those of the Sunrise Telephone Company relative to the proposed consolidation and a considerable majority of the subscribers have approved the plan. The Lincoln Telephone and Telegraph Company has therefore closed its option for the purchase of the Surprise Telephone Company's exchanges at Brainard, Bruno, David City, Dwight and Garrison.

NORTH CAROLINA.

Independent Telephone Company, Graham, N. C., incorporated with $50,000 capital to establish rural telephone system.

NORTH DAKOTA.

A new telephone line is being constructed from Brinsmade to Tilden. The work will be completed in the near future.

The Independent Telephone Company is constructing a new twenty-eight-mile full copper circuit telephone line to Manning, to connect with the already completed line from that town to Killdeer. The old Dickinson-Manning line, running by way of Fayette, Oakdale and New Hradec, will be abandoned.

The Hamilton telephone exchange now occupies commodious quarters on the second floor of the remodeled Johnson building, Fargo.

OHIO.

While excavating for the street paving on Grant street, Alliance, a big shovel ripped up a conduit of the Ohio State Telephone Company, pulling out the cable and throwing 35 telephones out of commission. Manager Swift had a force of men working all night to restore service.

The Ayersville Telephone Company, Ayersville; $4,000; C. M. Rhamy.

OKLAHOMA.

The Pioneer Telephone Company has a big force of workmen replacing the poles laid low by the wind storm on June 24, in Hobart. Delay in securing poles the length needed set back the work until now.

A force of thirty-five laborers are now at work installing a new telephone system in Norman. Three hundred and fifty poles are being set and 38,000 feet of cable will be strung.

Vickers Rural Telephone Company, Snyder. Incorporators, A. O. Grissom, R. G. Hardin, J. O. Nallon, Snyder. Capital stock, none.

The Afton telephone plant and system recently purchased by the Pioneer Telephone Company from the United Telephone Company will be improved.

PENNSYLVANIA.

At the annual meeting of the Slate Belt Telephone and Telegraph Company, at the offices in Nazareth, the following directors were re-elected for the ensuing year: Dr. J. C. Keller, Wind Gap; E. G. Markley, Bangor; Dr. E. E. Rosenberry, Stone Church; M. T. Swartz, Easton; E. A. Speer, Pen Argyl; William H. Milshsack and A. G. Connolly, Nazareth. Mr. Connolly was elected president and general manager, Dr. Keller, vice president, and James A. Grubb, secretary and treasurer.

A fire that started in the terminal of the Cumberland Valley Telephone Company, in a brick building owned by Mrs. William Yeager, in Valley street, Lewiston, caused damage of about $15,000.

Within the next few weeks the Bell Telephone Company in Ellwood City will have installed a fifth position in the operating board.

The Bell Company recently took title from John J. Kay to two three-story brick dwellings at 969 and 971 to 975 North Second street, Philadelphia, subject to a mortgage of $15,000. The entire lot is 80x236.4 feet, and the assessed value is $18,500.

Several builders are estimating on a three-story building at Kingston for the Bell Telephone Company. John T. Windrim is the architect.

The Bell Telephone Company has completed the installing of its underground conduits on Hazle street, Wilkes Barre.

The Bell Telephone Company of Scranton has bought another lot of the Fuller estate property on Adams avenue in the 100 block, adjoining the company's present property.

The Petroleum Telephone Company of Oil City, a West Virginia corporation, was made domestic with $500,000 capital.

SOUTH CAROLINA.

The Greenville telephone lines are now in good condition.

Telephone pay stations are being installed in almost every drug store in Greenville.

TENNESSEE.

Cumberland Telephone and Telegraph Company, Nashville, awarded contract for $300,000 exchange and office building; four stories high and 107 feet square.

TEXAS.

The service of the Southwestern Telegraph and Telephone Company in Austin, which has been "dead" three weeks as a result of fire which wrecked the company's plant, has been restored.

WEST VIRGINIA.

The Bell Telephone Company is repairing lines in Cameron.

An electrical storm did a great deal of damage to the lines of the National and Bell telephone companies in Martins Ferry and the rural districts.

WISCONSIN.

Damage to the cable of the Telephone company in Portage by an electrical storm amounted to about $200.

The Wisconsin Telephone Company is placing the wires underground in Kenosha.

The Wisconsin Telephone Company will build conduits in Madison on West Washington avenue to Chandler street and along Chandler. West on Bedford street the underground system will be installed in the street.

On August 1 a twenty-four hour service was inaugurated at Boillion.

Employees of the Wisconsin Telephone Company held their annual picnic August 17 at Washington Park, Milwaukee.

The Portage Telephone Company has issued new directories.